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# Appraisal of Diversification Opportunities: The Zambian Paprika Case Study

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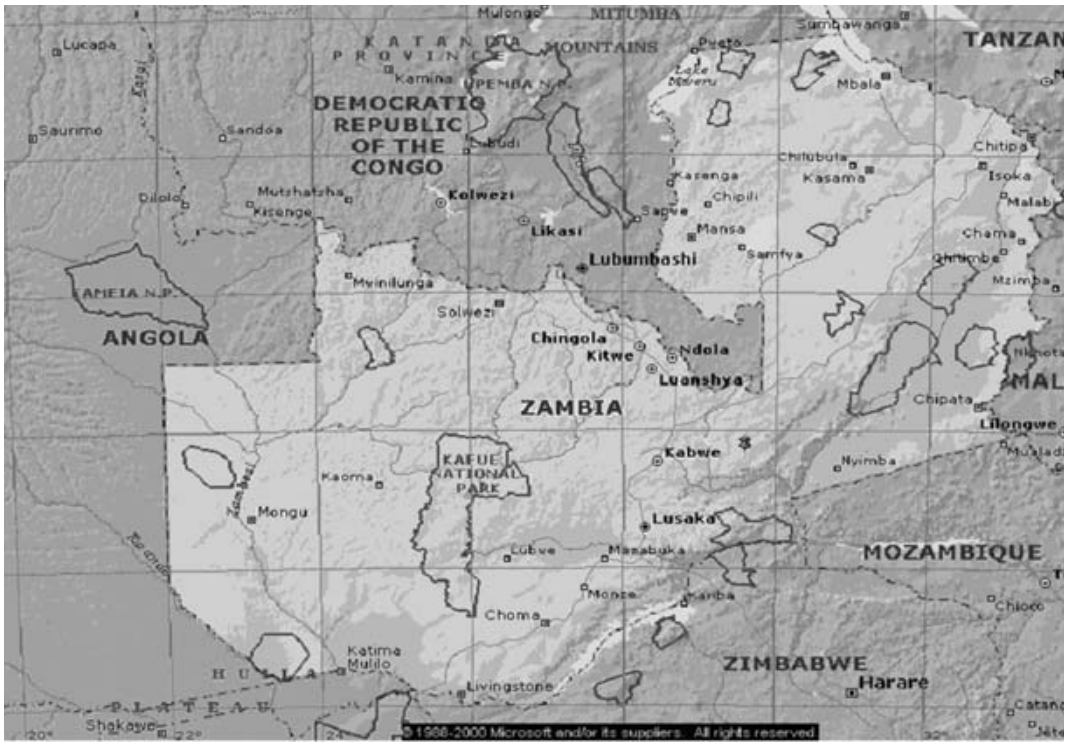
# Acronyms

| | |
|---|---|
| ABF | Agribusiness Forum |
| ADB | African Development Bank |
| ASHSP | Association of Smallholder Service Providers |
| ASTA | American Spice Trade Association |
| CGA | Central Growers Association |
| CIF | Cost, Insurance, Freight Included |
| CLUSA | Cooperative League of the United States of America |
| COMESA | Common Market for Eastern and Southern Africa |
| EDP | Export Development Programme |
| MACO | Ministry of Agriculture and Cooperatives |
| NORAD | Norwegian Agency for Development Cooperation |
| RIF | Rural Investment Fund |
| SCCI | Seed Control and Certification Institute |
| SFAP | Support to Farmer Associations Project |
| SHEMP | Smallholder Enterprise and Marketing Programme |
| ZAHVAC | Zambia Association of High-Value-Added Crops |
| ZAMTIE | Zambia Trade and Investment Enhancement Project |
| ZNFU | Zambia National Farmers' Union |



# Executive summary

The objective of this study is to review paprika production in Zambia and identify the features that have contributed to raising smallholder farm incomes, particularly the economics, market infrastructure, advisory services and information on paprika production, and policy support. The salient features are:

- Paprika was introduced as a cash crop in 1993 and, after initial fluctuation, production is now starting to increase steadily. Small-scale farmers account for around 70 percent of growers but less than 40 percent of the country's crop.
- Farmers can be divided into three types – small-scale, emergent and commercial. Most small-scale farmers grow between one quarter and one and a quarter hectares, with the median yield per farmer being 800kg/ha and 360kg per farm, while commercial farmers expect yields of 4 tonnes or more.
- Paprika production is distributed across a belt of Zambia with rainfall levels between 700 and 1 000 mm. Within that belt, production is concentrated in the areas where buyers are most active.
- On average, a small-scale farmer has revenues of US$ 437/ha and total variable costs are US$ 201, including labour, leaving a profit of US$ 236/ha.
- Prices vary among buyers, depending on quality, with 2002 prices ranging from ZMK 3 854 to ZMK 2 263 and averaging ZMK 2 622.
- Paprika quality is usually judged at the farm level in terms of grades, ranging from A to D, while at the industry level ASTA values are used to ascertain colour quality.
- The industry reported that 65 percent of purchases were grade A, while the industry rule of thumb is that the majority be classified as grade B. This may be explained by the practice of combining grades A with B, and C with D, for pricing purposes.
- Availability of labour, resources and management requirements are constraining factors on production. On average small-scale paprika production uses 124 person-days/ha, divided roughly equally between men and women, but with women doing most of the land preparation and destalking/deseeding. This compares with an expected 204 person-days.
- With paprika, incomes increase by 32 percent, to ZMK 2 535 741 million for men and by 52 percent, to ZMK 608 264 for women. Men prefer to spend their income on farm equipment, inputs and school costs, while women opt for clothes, kitchen utensils and inputs.
- Quality is an important issue in the paprika industry and is an area of conflict between farmers and buyers. Three areas of quality are relevant: colour, pungency and aflatoxin levels. Zambia's paprika quality is estimated to be 20 percent lower than that of Zimbabwe, and there are concerns that Zambia could be getting a reputation for poor quality.

- Factors impacting on quality include seed quality, pests and disease, and poor drying and storage techniques.
- Paprika competes with cotton and tobacco as an alternative cash crop for diversification. Revenue is higher than cotton, while direct costs and labour needs are lower than cotton and tobacco; but paprika is less profitable than tobacco.
- The local market infrastructure, particularly the strength of buyers, is key to the success of the industry, with most buying being conducted by seven companies. Cheetah Zambia Ltd and the six members of the Zambia Association of High-Value-Added Crops (ZAHVAC) are the main buyers.
- There are around 12 800 small-scale farmers growing paprika, and they are expected to produce some 2 250 tonnes in the 2002/03 season.
- Most paprika is deseeded and baled for export to South Africa, Europe and the United States as flake. Much of it is being sent to a single buyer in South Africa for processing into oleoresin. Some is ground into powder for export.
- Enviro Oils and Colourants Ltd is in the process of rehabilitating an oleoresin plant in Zambia, which has a capacity of 2 000 tonnes per year and is expected to produce 100 tonnes of oleoresin, equivalent to more than 40 percent of the current worldwide demand.
- Most small-scale farmers sign a contract with one of the buyers under which they receive seed, chemicals and occasionally fertilizer on credit. The buyer guarantees to purchase their crop, usually quoting a minimum price at the beginning of the season.
- Side-buying is rife by buyers under pressure to increase output, and the temptation is great for farmers to sell to the highest bidder, regardless of who supplied the initial inputs.
- Zambian production represents around 2 percent of the reported 120 000-tonne world demand for paprika.
- Major producers for the European market are South Africa, Peru, Zimbabwe, Zambia and China, while major importers are Spain, the United States and Germany.
- Regionally, South Africa and Zimbabwe represent the main competition for Zambia, although there are mixed reports about the effects of Zimbabwe's political turmoil on its paprika industry.
- The established practice of supplying inputs on credit to farmers has encouraged the industry's growth, although there are problems with loan recoveries and side-buying: some buyers are exploring ways of addressing these problems. The members of ZAHVAC are attempting to promote a smallholder irrigation scheme for paprika.
- The main buyers provide extension advice and varying degrees of information to small-scale farmers through leaflets and manuals. Some of the advice is funded by donor support, predominantly through the Support to Farmer Associations Project, funded by the Ministry of Agriculture and Cooperatives and the Norwegian Agency for Development Cooperation.
- Donor support is considered by some buying companies to be crucial to the continuation of the paprika industry in Zambia, while others believe disparities in support are leading to an unlevel playing field. A number of organizations already provide financial and technical assistance support.

- While paprika *per se* is not targeted for policy support by the Government, its stated policy is to support agriculture. The paprika industry has received around a quarter of the ZMK 10 billion funding earmarked to the sector.
- The industry requires various operating licences, acquisition of which is not considered particularly onerous, and, indeed, regulation was welcomed as a method of keeping unscrupulous traders out of the market.
  International measures were not considered a particular barrier to the industry.

## Conclusions

- Small-scale farmers are an important source of paprika production in Zambia.
- Small-scale farmer yields are low.
- Rainfall and market availability are the predominant factors in production location.
- Paprika is a profitable activity for small-scale farmers, who spend their additional income on a range of welfare-enhancing benefits.
- Availability of labour, resources and management are constraining factors.
- Prices vary among buyers.
- Quality is an important factor in price and is considered a problem in Zambia.
- Colour, pungency and aflatoxin levels are the main determinants of quality.
- Seed quality, pests and disease, and poor drying and storage techniques account for much of the poor quality.
- Paprika competes with tobacco and cotton as an alterative cash crop among small-scale farmers.
- Local market infrastructure, particularly the strength of buyers, is key to the continuation of the industry.
- The Zambian industry relies heavily on a single South African processor for much of its production.
- An oleoresin plant is being rehabilitated in Zambia and is likely to increase demand for pods.
- Contract issues, side-buying and non-repayment of input loans are issues for the industry.
- Most buyers, often with the support of donor or government funds, provide extension advice and information but opinions are mixed as to the requirements and administration of donor and government support.
- The Government has a stated policy of encouraging agricultural development, and while paprika is not explicitly targeted, the sector has, in practice, received significant financial support.
- Local and international licences and regulations are not considered barriers to the industry.

## Reasons for diversification into paprika

- Appropriate climatic conditions
- Promotion by buyers

- Availability of market
- Perceived certainty of buyers
- Profitability
- Availability of inputs
- Availability of input credit
- Perceived comparative advantages over cotton and tobacco
- Availability of extension advice and information

## RECOMMENDATIONS FOR ENCOURAGING DIVERSIFICATION INTO PAPRIKA

- Targeting of areas where conditions are appropriate
- Encouragement of commercial buyers
- Facilitation of market
- Improvement and/or maintenance of profitability by:
  - o Increasing revenue:
    - Increasing yield
    - Improving quality
    - Adding value
    - Transparency in grading process
    - Provision of extension advice
    - Provision of price information
  - o Reducing costs:
    - Provision of inputs
    - Provision of credit
    - Reducing uncertainty

# 1. Introduction

This case study appraises the opportunities for increasing farm income in Zambia by growing paprika (*Capsicum annuum*), which is of the same family as tomato, tobacco, potato and eggplant. Paprika is used as a flavoring and a colorant in the food industry. The colour is measured in ASTAs, which are units defined by the American Spice Trade Association. The aim is to identify the characteristics of paprika that make it particularly attractive to small-scale farmers as an alternative cash crop, and thus draw on those factors to develop a model for crop diversification in general. It is important to note that data from business competitors in this report cannot be considered reliable and do not necessarily reflect common interests. The exchange rate of 4 800 Zambian kwacha (ZMK) to one United States dollar is used throughout the document.

Paprika was first introduced in Zambia as a cash crop in 1993, when Cheetah Zambia Ltd established operations with 200 small-scale farmers. Other operators set up in 1995/96, when farmer numbers increased to a peak of 2 000 on the promise of profits second only to tobacco. Numbers then dropped off to around 600 with the withdrawal of some commercial farmers and a more selective policy of farmer identification by the Cooperative League of the United States of America (CLUSA), which previously accounted for 1 000 growers. Core farmer numbers now appear to be more stable and are growing as a result of new areas of the country being opened up by buyers. While a handful of commercial farmers have entered and, in some cases, left the market, the vast majority of farmers are small-scale farmers in 'outgrower' schemes under contracts with buyers. Small-scale farmers account for nearly all the growers, but they produce less than 40 percent of the country's crop.[1] While a commercial farmer might achieve yields of up to 4 tonnes per hectare (ha), small-scale farmers in Zambia are achieving around 250 to 500 kilograms (kg)/ha.[2]

Once farmers have made the decision to diversify into a cash crop in addition to their maize food-security crop, paprika is viewed as particularly profitable, along with cotton and tobacco, but as being less labour intensive. Fluctuating international prices of the four crops are thus likely to influence the relative attractiveness of each. It is useful, however, to consider briefly the concept of crop diversification in general in identifying the motivations for growing a new crop. Ultimately, the motivation is increased welfare, usually measured in monetary terms, and subject to the bounds of available resources for initial investment. Superimposed on that are perceptions about reduction of risk, whether through use of irrigation or inputs, or early planting, or in terms of pricing through having an alternative market.

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1 Mark Terken, managing director, Cheetah (Zambia) Ltd.
2 Catherine Mwanamwambwa, Agribim Ltd.

Paprika can be cultivated from sea level to 1500 metres (m) in optimum temperatures of between 24°C and 32°C, in a well-draining, loamy fertile soil with a pH between 6 and 6.5. Rainfall of more than 800 mm is desirable and yields can be up to 5 tonnes/ha with inputs, irrigation and artificial drying. Small-scale farmers without inputs might achieve from 300 to 500 kg/ha, compared with an average of 2.3 tonnes from a high-yield system and 1.6 tonnes from a low-yield system.[3] Notwithstanding the drought conditions over the last three years, Southern Province is reported to offer the best conditions in Zambia for producing paprika.[4] In Zambia, the nursery is prepared from August: 24 seedbeds of 10 m by 1.2 m are needed for a hectare. The seedbeds are sterilized, usually by burning. Because of erratic rainfall, Zambian recommendations suggest planting two beds around October 14 and transplanting November 25, two beds planted October 28 and transplanted December 9, and two beds planted November 18 and transplanted December 30. The important insects are aphids, cutworms and thrips. Recommended basal dressing is 100 kg/ha of Compound D (10:20:10), about one No.8 cup per plant, or one Coca-Cola can full of old cow manure. A virgin field is preferred, with spacing of 90 cm between 25 cm high ridges, preferably in an east-west direction, but along the contours in any event. Transplant at six weeks, when the seedlings are about 15 cm in height, preferably on a rainy or cloudy day. Before transplanting, soak the seedbeds until the water does not drain. Plant population is 80 000 per hectare, 15 cm between plants on the ridge. The crop should be on a rotation, but not with tobacco, tomato, potato or eggplant.

The case study is in seven parts: Production Systems uses specially collected primary data from Central Province and buyers to define producer classifications, reports the distribution of paprika-growing activity, describes the level of management, explains farmer-level marketing, examines resource allocation and management, describes the utilization and distribution of incremental income and reports small-scale farmer opinion on paprika. The section on Market Structure reports on issues of product quality, examines the economics behind competing annual crops, describes the Zambian market structure, outlines buyer profiles, describes the business arrangements and contract form, explains the international market structure and lists the constraints to paprika production in Zambia. The following section of Support Facilities, Advisory Services and Information outlines the supply and distribution of inputs, describes the private extension services and reports on the support for capacity-building. Policy Support assesses government support for the paprika industry and reviews domestic agricultural policies and international and regional trade policy, including customs codes and tariffs and quotas. Risks in the local industry are reported on, together with an assessment of political goodwill. Conclusions includes a summary of diversification features, followed by Recommendations for encouraging diversification into paprika.

The general outcome of the case study is positive.

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3 "Findings of the Joint Ministry of Agriculture and Cooperatives (MACO)/Zambia National Farmers' Union (ZNFU) Study on Agriculture Sector Competitiveness and Impact of the COMESA Free Trade Area", the Agricultural Consultative Forum, February 2002.
4 Ibid.

# 2. Production Systems

## 2.1 Producer classifications

There are three types of farmer – commercial, emergent and small scale. Irrigated systems are generally confined to commercial farmers; emergent farmers, who typically farm 1 to 5 ha, will grow rainfed crops with medium inputs; and small-scale farmers, typically growing between 1 lima[5] and 1 ha, will use minimum inputs. Emergent farmers are not considered a significant sector in the context of total industry production.

Data are in . From a sample of 55 small-scale farmers between Chibombo and Mumbwa, 42 percent are growing paprika on between 1 and 3 limas (0.25 to 0.75 ha), 35 percent on between 3 limas and 5 limas (0.75 to 1.25 ha) and 16 percent on between 5 and 7 limas (1.25 to 1.75 ha). Four percent are growing paprika on between 7 and 9 limas (1.75 to 2.25 ha) and the remaining 4 percent on 11 to 13 limas (2.75 to 3.25 ha).

5 One lima is a quarter of a hectare.

**Table 1. Field sizes from a survey of small-scale farmers. Most small-scale farmers grow less than 7 limas (1.75 ha)**

| Small-scale farm size distribution | | | |
|---|---|---|---|
| Range | | | |
| **Limas** | **hectares** | **Frequency** | **%** |
| 1-3 | 0.25-0.75 | 23 | 42% |
| 3-5 | 0.75-1.25 | 19 | 35% |
| 5-7 | 1.25-1.75 | 9 | 16% |
| 7-9 | 1.75-2.25 | 2 | 4% |
| 9-11 | 2.25-2.75 | 0 | 0% |
| 11-13 | 2.75-3.25 | 2 | 4% |
| **Total** | | **55** | **100%** |

**Figure 1 shows the distribution of field size from a survey of small-scale farmers. Most farmers are growing paprika on between one quarter and one and a quarter hectares**

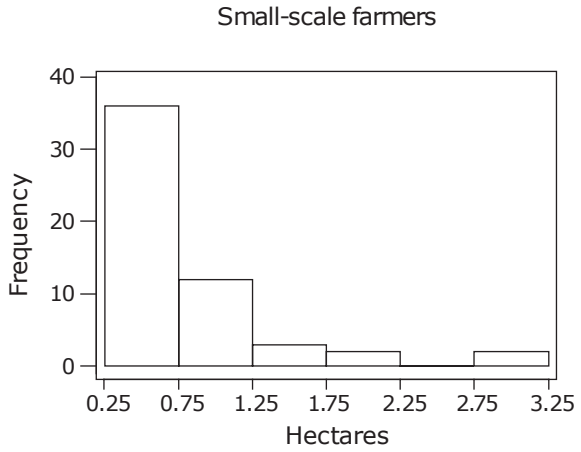



Table 2. Farm size, yield and revenue data for small-scale farmers between Chibombo and Mumbwa in Central Province. The mean size of small-scale farms producing paprika is 2.6 limas (0.66 ha), with a standard deviation of 2.5 limas (0.62 ha). The median suggests that most paprika fields are around 2 limas (0.5 ha). The largest field was 12 limas (3 ha) and the smallest, 1 lima (0.25 ha). The smallest field size is explained by the smallest unit 'input pack' from sponsors, which is for 1 lima (0.25 ha).

The average production per farmer was 717 kg with a standard deviation of 793 kg. The median suggests that the distribution is severely distorted, with a tendency towards lower yields, and that most farmers produce around 360 kg; but nevertheless there are some larger yields, the highest being 3 225 kg, and the lowest was 95 kg. The average yield per hectare is 1 085 kg with a standard deviation of

705 kg. The median suggests most farmers in the sample are producing around 800 kg/ha. The highest reported yield per hectare was 3 225 kg, and the lowest was 319 kg. That the highest yield and yield per hectare are the same is explained by the farm size being one hectare. This yield is very high: regression shows it to be an outlier and the average yield to be 851 kg/ha.

The mean revenue for farmers is ZMK 1.73 million (US$ 360) with a standard deviation of ZMK 1.77 million (US$ 369); the median is ZMK 1 million (US$ 208).

**Table 2. Farm size, yield and revenue data for small-scale farmers between Chibombo and Mumbwa in Central Province**

| | Farm size, yield and revenue data | | | | | |
|---|---|---|---|---|---|---|
| | **Limas** | **Hectares** | **Yield** | **Yield/ha** | **Revenue** | **Price/kg** |
| Mean | 2,64 | 0,66 | 716,69 | 1085,05 | K1.726.955 | K2.622 |
| Median | 2 | 0,5 | 360 | 800 | K1.040.000 | K2.662 |
| StDev | 2,47 | 0,62 | 793,45 | 705,24 | K1.766.440 | K602 |
| Maximum | 12 | 3 | 3225 | 3225 | K6.635.000 | K4.500 |
| Min | 1 | 0,25 | 95 | 318,67 | K181.000 | K1.453 |
| N | 55 | | 55 | 55 | 55 | 55 |

Thirty-eight percent of farmers have yields of between 250 and 750 kg/ha; it seems unlikely that these farmers are using inputs. A further 33 percent of farmers are in the next class, producing between 750 and 1 250 kg/ha, and these farmers may be using inputs. As the yield classes rise, farmers increasingly use inputs, are increasingly better managed, and probably have access to irrigation. It is important to appreciate that without irrigation, yield is limited to around 20 percent of potential. The implication is that farmers yielding better than 750 kg/ha are achieving good yields. It is clear, however, that most small-scale farmers use few or no inputs.

**Table 3. Distribution of yields per hectare found in a sample of small-scale farmers**

| **Yield per hectare** | **Distribution of yields per hectare Frequency** | **%** |
|---|---|---|
| 250-750 | 21 | 38% |
| 750-1250 | 18 | 33% |
| 1250-1570 | 7 | 13% |
| 1570-2250 | 3 | 5% |
| 2250-2750 | 4 | 7% |
| 2750-3250 | 2 | 4% |
| | 55 | 100% |

These figures may suffer from biases due to farmer exaggeration and preferred participants: the Zambia Association of High-Value-Added Crops (ZAHVAC) reports its members' small-scale farmers achieve yields under rainfed conditions averaging around 600 kg/ha, with a handful of more productive farmers achieving 1.2 tonnes/ha.

## 2.2 Distribution of paprika growing activity

Paprika is grown across a belt of Zambia with rainfall levels between 700 and 1 000 mm, effectively encompassing Central, Southern, Western and Eastern Provinces. The location of production is contingent on climate and local activity by buyers. While there is some overlap in buyer territory, particularly in Central Province, ZAHVAC members, for example, tend to have their own 'patches' and try not to encroach on those of other members. Cheetah buys from an area stretching 100 km south of Lusaka to 200 km north, and from Mongu in the west to the Malawi border in the east.

ZAHVAC's five paprika-growing members operate in smaller areas. Biopest Company Ltd has farmers in Chibombo and Kabwe in Central Province and Chongwe near Lusaka; Agribim Company Ltd and associated companies operate in Mumbwa, Kaoma and Chibombo in Central Province, Chipata, Lundazi and Nyimba in Eastern Province, and Monze and Choma in Southern Province; Mipachima Ltd is in Mgula, near Kabwe; Steadfast Ltd near Monze in Southern Province; and White Rose Ltd in Lusaka West.

## 2.3 Level of management

The level of management in paprika production can be classified into irrigated production with artificial drying facilities, irrigated production without artificial drying facilities, rainfed production with medium inputs and rainfed production with minimum inputs. The first two are commercial farmers, emergent farmers practice rainfed with medium inputs and small-scale farmers practice rainfed with minimum inputs. The impacts of the level of management are best reflected in the economics of the systems.

Table 4. Gross margin budgets for small-scale, emergent and commercial farmers. Small-scale farmers do not use fertilizers, but do use chemicals if essential. It is estimated that there is a probability of 10 percent of using insecticides and a 15 percent probability of using a fungicide; these probabilities are used to find the expected costs of these inputs. The median yield is 360 kg/ha. The labour is valued at half the minimum labour rate.[6] They burn to sterilize the nursery and do not use

6 It is well observed that farmers pay under the minimum wage rate: half price is a fair estimate.

oxen for land preparation. It is assumed that the small-scale farmer has an opportunity cost of 10 percent of his investment, including the opportunity cost of labour. His revenue from sales is US$ 437 and his total variable cost is US$ 201, making a profit of US$ 236. This includes the cost of labour; but if this is removed, because it is household labour and is not an incremental cost, the actual cash margin received by the farmer is US$ 338.

Emergent farmers are assumed to use fertilizer at the prescribed rates and use oxen to prepare the land. Their yield is expected to be around 1.3 tonnes/ha, and they have to employ correspondingly more people, but still at half the minimum rate. Emergent farmers receive a cash margin of between US$ 161 and US$ 256 depending on the extent to which they can use household labour. Commercial farmers use all inputs, tractors, irrigation, and they artificially dry the paprika when needed. They are also faced with a pro rata increase in labour in line with increased production and the full minimum wage rate. Producing 4 tonnes per season, these farmers expect a gross margin of US$ 490 per hectare.

In terms of numbers of farmers, neither emergent nor commercial farmers are important. In terms of production, commercial farmers make a substantial contribution to paprika production in Zambia.

## 2.4 FARMER LEVEL MARKETING

Table 5. Average market prices from the different sponsors for average product purchased at season end, 2002. For all the buyers, the mean price was ZMK 2 622 (US$ 0.546), with a standard deviation of ZMK 602 (US$ 0.125). The median price was a little higher, ZMK 2 662 (US$ 0.555).

The highest mean price in the 2001/2 season was offered by CLUSA, paying an average of ZMK 3 854 (US$ 0.80)/kg, with a standard deviation of ZMK 382 (US$ 0.08), which represents 10 percent of the mean . The median is ZMK 3 786 (US$ 0.79), which suggests the distribution is close to normal. This price is 30 percent higher than Agribim and 70 percent higher than Cheetah. Since CLUSA is not a trader in its own right, its motives are unclear for offering this perceived high price, but it is no longer buying and no longer part of the pricing mechanism. It should also be noted that CLUSA has in the past offered high prices to farmers, but also charged correspondingly high interest on input credit.

Agribim was the second highest payer, paying an average of ZMK 2 955 (US$ 0.62) with a standard deviation of ZMK 81 (US$ 0.02), giving the lowest coefficient of variation of 3 percent, making it the lowest risk buyer from the farmers' perspective. The median price is actually higher, suggesting that most farmers received more than the mean.

## Table 4. Gross margin budgets for small-scale, emergent and commercial farmers

| | | | Gross margin budget | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Price | | Small-scale | | Emergent | | Commercial | |
| | Unit | ZMK | US$ | | Units | Total | Units | Total | Units | Total |
| Revenue | kg | K2.622 | US$ | 0,55 | 800 | US$ 436,95 | 1.300 | US$ 710,04 | 4.000 | US$ 2.184,73 |
| **Variable costs** | | | | | | | | | | |
| **Nursery costs** | | | | | | | | | | |
| Seed | kg | K160.000 | US$ | 33,33 | 1,2 | US$ 40,00 | 1,2 | US$ 40,00 | 1,2 | US$ 40,00 |
| Sterilization, methyl bromide | tins | K19.200 | US$ | 4,00 | Burn | US$ - | Burn | US$ - | 12 | US$ 48,00 |
| Fumigation sheets | sheets | K24.000 | US$ | 5,00 | 0 | US$ - | 0 | US$ - | 2 | US$ 10,00 |
| Basal dressing, D compound | kg | K1.480 | US$ | 0,31 | 0 | US$ - | 0 | US$ - | 200 | US$ 61,67 |
| Copper oxychloride | lt | K48.000 | US$ | 10,00 | 0 | US$ - | 0 | US$ - | 1,2 | US$ 12,00 |
| Labour | SMDs | K4.500 | US$ | 0,94 | 4 | US$ 3,75 | 4 | US$ 3,75 | 1 | US$ 0,94 |
| **Subtotal nursery** | | | | | | **US$ 43,75** | | **US$ 43,75** | | **US$ 172,60** |
| **Field costs** | | | | | | | | | | |
| Nematode control | lt | | US$ | - | 0 | US$ - | 0 | US$ - | 0 | US$ - |
| Basal dressing, D compound | bags | K74.000 | US$ | 15,42 | 0 | US$ - | 8 | US$ 123,33 | 8 | US$ 123,33 |
| Top dressing, urea | bags | K74.000 | US$ | 15,42 | 0 | US$ - | 8 | US$ 123,33 | 8 | US$ 123,33 |
| CuOxy+diathin, p=10% | kg | K60.000 | US$ | 12,50 | 10% | US$ 1,25 | 10% | US$ 1,25 | 10% | US$ 1,25 |
| Tamaron/cypermethrin, p=15% | ml | K42.000 | US$ | 8,75 | 15% | US$ 1,31 | 15% | US$ 1,31 | 15% | US$ 1,31 |
| **Labour** | | | | | | | | | | |
| Land preparation | md | K2.400 | US$ | 0,50 | 56 | US$ 28,00 | 0 | US$ - | 0 | US$ - |
| Transplanting | md | K2.400 | US$ | 0,50 | 28 | US$ 14,00 | 28 | US$ 14,00 | 28 | US$ 28,00 |
| Cultivation/spraying | md | K2.400 | US$ | 0,50 | 56 | US$ 28,00 | 56 | US$ 28,00 | 56 | US$ 56,00 |
| Harvesting | md | K2.400 | US$ | 0,50 | 12 | US$ 6,00 | 20 | US$ 10,00 | 45 | US$ 45,00 |
| Destalking/deseeding | md | K2.400 | US$ | 0,50 | 28 | US$ 14,00 | 46 | US$ 23,00 | 105 | US$ 105,00 |
| Drying/grading | md | K2.400 | US$ | 0,50 | 20 | US$ 10,00 | 33 | US$ 16,50 | 75 | US$ 75,00 |
| Baling | md | K2.400 | US$ | 0,50 | 4 | US$ 2,00 | 7 | US$ 3,50 | 15 | US$ 15,00 |
| Oxen (hire) | ha | K200.000 | US$ | 41,67 | 0 | US$ - | 1 | US$ 41,67 | 0 | US$ - |
| Tractor (hire) | ha | K250.000 | US$ | 52,08 | 0 | US$ - | 0 | US$ - | 1 | US$ 52,08 |
| Irrigation | ha | K1.000.000 | US$ | 208,33 | 0 | US$ - | 0 | US$ - | 1 | US$ 208,33 |
| Artificial drying | ha | K1.750.000 | US$ | 364,58 | 0 | US$ - | 0 | US$ - | 1 | US$ 364,58 |
| Drying rack repairs | per kg | K22.500 | US$ | 4,69 | 1 | US$ 4,69 | 1,63 | US$ 7,64 | 3,75 | US$ 17,58 |
| Baling materials | bags | K1.000 | US$ | 0,21 | 50 | US$ 10,42 | 82 | US$ 17,08 | 188 | US$ 39,17 |
| Transport | K/kg | K100 | US$ | 0,02 | 800 | US$ 16,67 | 1.300 | US$ 27,08 | 3.000 | US$ 62,50 |
| Contingency | | | | 5% | | US$ 6,82 | 5% | US$ 21,89 | 5% | US$ 65,87 |
| Subtotal field costs | | | | | | US$ 143,15 | | US$ 459,59 | | US$ 1.383,35 |
| Interest on variable costs | | | | 10% | | US$ 14,32 | 10% | US$ 45,96 | 10% | US$ 138,33 |
| **Total variable costs** | | | | | | **US$ 201,22** | | **US$549,30** | | **US$1.694,29** |
| **Gross margin** | | | | | | **US$ 235,73** | | **US$160,74** | | **US$ 490,44** |
| *Cash margin (excl. labour)* | | | | | | *US$ 337,73* | | *US$ 255,74* | | |
| **Total labour** | | | | | **204** | | **190** | | **324** | |
| **Return to labour** | | | | | | **116%** | | **85%** | | **151%** |
| **Return to variable costs** | | | | | | **117%** | | **29%** | | **29%** |

ZAHVAC[7] was the third highest payer but one of the smaller players, paying an average of ZMK 2 729 with a standard deviation of ZMK 261, 10 percent of the mean. The median price is about the same. Enviro Oils and Colourants Ltd is also a small operator in the area, paying ZMK 2 710 with a standard deviation of ZMK 127, being only 5 percent of the mean.

Biopest is the third lowest payer in the market, paying ZMK 2 509 with a standard deviation of ZMK 528, which is 21 percent of its mean. The median of ZMK 2 759 is higher than the mean, suggesting that most farmers received a higher price than average. The market was the second worst payer, ZMK 2 509 with a standard deviation of ZMK 550.

Cheetah is the lowest payer, paying ZMK 2 277 with a standard deviation of ZMK 325, which is 14 percent of the mean price. The median is a little higher than the mean at ZMK 2 277.

The tendency for the medians to be higher than the means suggests that one or more buyers are buying some paprika at lower prices than expected normally.

The data may contain anomalies: the market and ZAHVAC data may mean the produce has been sold to a buyer other than the one to whom it was contracted: although the market does buy, it does not differentiate on grade quality for spice, and ZAHVAC is an organization with a membership of competing buyers. From the raw data it can be seen that the market and ZAHVAC entries are complex purchases, that is, a range of qualities has been sold, from grade B to seed, and only a few buyers differentiate quality carefully. This suggests that there is some side-buying in the field.

**Table 5. Average market prices from the different sponsors for average product purchased at season end, 2002**

| | | Market prices, 2002 | | | |
|---|---|---|---|---|---|
| | **n** | **Mean** | **Median** | **StDev** | **CV** |
| CLUSA | 6 | K3.854 | K3.796 | K382 | 10% |
| Agribim | 7 | K2.955 | K3.000 | K81 | 3% |
| ZAHVAC | 4 | K2.729 | K2.743 | K261 | 10% |
| Enviro Oils | 2 | K2.710 | K2.710 | K127 | 5% |
| Biopest | 10 | K2.509 | K2.759 | K528 | 21% |
| Market | 2 | K2.319 | K2.319 | K559 | 24% |
| Cheetah | 24 | K2.263 | K2.277 | K325 | 14% |
| All | 55 | K2.622 | K2.662 | K602 | 23% |

7 ZAHVAC is an association whose members include Enviro Oils and Colourants, Agribim and Biopest.

Uncertainties over pricing have been exacerbated by the reluctance in recent years of traders to offer a fixed price at the beginning of the season. Most now specify a minimum price as a guideline, although quality issues have reduced this practice.

Table 6. Distribution of prices paid to small-scale, intermediate and commercial farmers for whole-pod paprika for the season 2001/2, delivered to the Lusaka warehouse of Cheetah. Prices for small-scale and intermediate farmers are for deliveries of less than one tonne and for commercial farmers of more than one. A premium of 2 percent is paid on deliveries of more than 20 tonnes, and of 4 percent for deliveries of more than 40 tonnes, over the duration of the season. Both classes of farmers must deliver with less than 28% seed and without stems. Clean, yellow seed and green stem is US$ 0.12 per kilogram, delivered to Lusaka.

**Table 6. Distribution of prices paid to small-scale, intermediate and commercial farmers for whole-pod paprika for the season 2001/2, delivered to the Lusaka warehouse of Cheetah**

| Grade | Small-scale and intermediate farmers 250 kg < Price Lusaka/kg <1 tonne Seed < 28%, no stems | Commercial growers, Field area > 10 ha 1 tonne < Price Lusaka/kg < 20 tonnes Seed < 28%, no stems |
|---|---|---|
| A | US$ 1.00 | US$ 1.20, ASTA > 320 |
| B | US$ 0.80 | US$ 0.95, ASTA > 270 |
| C | US$ 0.60 | US$ 0.70, ASTA > 220 |
| D | US$ 0.40 | US$ 0.45, ASTA > 160 |
| Seed, stem | US$ 0.12 | US$ 0.12 |

Pod is also picked up from collection centres throughout the country. Prices paid at these centres are less than those in Lusaka because of transport and administrative costs and because grading is more general.

| Grade | Kwacha | US$ |
|---|---|---|
| A, B | ZMK 2 500 | US$ 0.52 |
| C, D | ZMK 1 500 | US$ 0.3125 |
| Seed, stem | ZMK 300 | US$ 0.0625 |

Table 7. Distribution of yields and prices by grade, as well as purchasing in the sample area Of paprika purchased from small-scale farmers in the sample area, 25 731 kg was priced as A grade, 6 545 kg priced at B grade, 3 737 kg at C grade, 2 900 kg as D grade and 505 kg as seed. This is vastly different from the expected distribution of 5 percent A grade, 80 percent B grade, 10 percent C grade and

5 percent D grade. It is consistent with reports than some buyers are paying more than the market price for lower-quality product that is, in some cases, neither destalked nor deseeded, but it is also consistent with a market player needing to purchase. The expected production in each grade is around 1 917 kg of A grade, 31 534 kg of B grade, 3 942 kg of C grade and 1 971 kg of D grade and the same amount of seed. Assuming that this is the real production, then the buyers have spent around 6 percent more for the product than they needed to. This suggests that demand exceeds supply and the presence of aggressive buyers.

The mean prices paid for the grades were ZMK 2 836 (US$ 0.591) for A grade, with a standard deviation of ZMK 579 (US$ 0.121) and a median of ZMK 2 800 (US$ 0.583); for B grade, ZMK 2 348 (US$ 0.489) with a standard deviation of ZMK 643 (US$ 0.134) and a median of ZMK 2 500 (US$ 0.521); for C grade, ZMK 1 650 (US$ 0.344) with a standard deviation of ZMK 424 (US$ 0.088) and a median of ZMK 1 500 (US$ 0.312); for D grade, ZMK 1 188 (US$ 0.247) with a standard deviation of ZMK 340 (US$ 0.071) and a median of ZMK 1 200 (US$ 0.250); and for seed, ZMK 500 (US$ 0.104), with no standard deviation and necessarily the same median.

There were 49 purchases reported of grade A in the sample, 25 purchases of grade B, 16 of grade C, eight of grade D and ten of seed. Cheetah was the largest buyer of the various grades, with 38 purchases, followed by Biopest with 25, and third ZAHVAC and CLUSA equal with 13 each. Agribim bought eight lots, Enviro Oils reportedly bought three lots and the market bought six. Bearing in mind that Agribim, Enviro Oils and Biopest are members of ZAHVAC, and that ZAHVAC also purchased, the ZAHVAC member purchases numbered 51 compared with Cheetah's 38: CLUSA was selling to Cheetah and ZAHVAC members.

## Table 7. Distribution of yields and prices by grade, as well as purchasing in the sample area4

| | **Distribution of grades and prices** | | | | | |
|---|---|---|---|---|---|---|
| | **Grades** | | | | | |
| | **A** | **B** | **C** | **D** | **Seed** | **Totals** |
| Production | 25 731 | 6 545 | 3 737 | 2 900 | 505 | **39 418** |
| Reported prop. | 65% | 17% | 9% | 7% | 1% | **100%** |
| Expected prop. | 5% | 80% | 10% | 5% | | **100%** |
| Expected kg | 1 971 | 31 534 | 3,942 | 1 971 | - | **39 418** |
| Mean price | K2 836 | K2 348 | K1 650 | K1 188 | K500 | **K2 622** |
| Median | K2 800 | K2 500 | K1 500 | K1 200 | K500 | **K2 662** |
| StDev | K579 | K643 | K424 | K340 | K0 | **K602** |
| | **Purchases** | | | | | |
| CLUSA | 6 | 4 | 2 | 1 | 0 | **13** |
| Bimzi | 7 | 1 | 0 | 0 | 0 | **8** |
| ZAHVAC | 4 | 3 | 1 | 2 | 3 | **13** |
| Enviro Oils | 2 | 1 | 0 | 0 | 0 | **3** |
| Biopest | 9 | 8 | 4 | 3 | 3 | **27** |
| Market | 2 | 1 | 1 | 1 | 1 | **6** |
| Cheetah | 19 | 7 | 8 | 1 | 3 | **38** |
| Total | 49 | 25 | 16 | 8 | 10 | |

## 2.5 Resource allocation and management

Crop diversification of any kind, within the context of Zambian small-scale agriculture, is constrained by the amount of land that can be cultivated, which is generally a function of available labour. In addition to land and labour, the availability of resources for inputs has a bearing on the choice of cash crop, as does the agro-ecological conditions in which the farmer finds him or herself.

The main crops in the survey area are maize, cotton, sunflower, soybean and groundnuts. Before paprika was grown, 48 percent of the farming system was maize, followed by cotton with 33 percent. Sunflower represented 11 percent and soybean and groundnuts, 3 and 5 percent respectively. From the perspective of the use of labour, maize receives much less attention than expected, only 30 percent, and groundnuts receive much more.

Table 8. Distribution of crops and labour before and after the adoption of paprika in the cropping system. After the adoption of paprika, the maize area appears to decline to 40 percent, cotton remains roughly constant, paprika jumps immediately to third place in the cropping system with 10 percent, taking sunflower's place. Sunflower area is 9 percent, Soybean 5 percent and groundnuts 4 percent. The labour allocation has increased relatively for maize, and substantially diminished for cotton, while paprika receives roughly the expected. Sunflower decreases to 6 percent and groundnuts remain high, but soybean labour increases greatly.[8]

**Table 8. Distribution of crops and labour before and after the adoption of paprika in the cropping system**

| | Distribution of main crops | | | |
|---|---|---|---|---|
| | After | | Before | |
| | Area (%) | pd/ha (%) | Area (%) | pd/ha (%) |
| Maize | 40% | 33% | 48% | 30% |
| Cotton | 32% | 16% | 33% | 28% |
| Paprika | 10% | 9% | 0% | 0% |
| Sunflower | 9% | 6% | 11% | 11% |
| Soybean | 5% | 18% | 3% | 5% |
| Groundnut | 4% | 17% | 5% | 25% |

Table 9. Average allocation of land and labour for cultivation for the present year and the average former allocation of land and labour before paprika was grown.

8 The sudden increase in attention on soybean may be explained by CLUSA activity.

Before farmers grew paprika, maize was the most popular crop, on average 3.08 ha was grown, followed by 2.51 ha of cotton, 1.85 ha of sunflower, 1.5 ha of soybean and 0.9 ha of groundnuts. After farmers started growing paprika, maize appears to decline to 2.56 ha. Cotton might be slightly higher at 2.96 ha, sunflower appears to be higher at 2.02 ha, soybean appears to have declined substantially, to 0.89 ha and groundnuts are little changed at 0.86 ha.

During the transition, the distribution of male and female labour on the crops does not appear to change for maize, sunflower and groundnuts, but cotton may have risen, both for men and women, and soybean may have declined. Total person-days appear to be up on all fronts, except for soybean, where there appears to have been a decline. Person-days per hectare appear to have risen for maize, soybean and groundnuts and diminished for cotton and sunflower.

## Table 9. Average allocation of land and labour for cultivation for the present year and the average former allocation of land and labour before paprika was grown

| | Hectares, labour distribution and mandays | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before | | | | | | After | | | | | |
| | n | ha | Male | Female | Total md | md/ha | n | ha | Male | Female | Total md | md/ha |
| Maize | 50 | 3,08 | 3,09 | 4,02 | 352,04 | 158,51 | 54 | 2,56 | 3,11 | 4,04 | 491,20 | 236,67 |
| Cotton | 46 | 2,51 | 3,13 | 4,11 | 364,81 | 178,42 | 38 | 2,96 | 3,62 | 4,57 | 416,44 | 153,83 |
| Sunflower | 20 | 1,85 | 2,75 | 4,35 | 251,33 | 142,22 | 16 | 2,02 | 2,88 | 4,44 | 265,29 | 121,08 |
| Soybean | 7 | 1,54 | 3,71 | 3,43 | 318,14 | 183,00 | 18 | 0,89 | 3,39 | 3,17 | 254,39 | 332,89 |
| Groundnuts | 21 | 0,90 | 2,38 | 3,76 | 238,33 | 329,22 | 16 | 0,86 | 2,31 | 3,69 | 286,79 | 352,34 |

Table 10. Results of t-tests on changes in planted area, male and female labour, number of person-days and number of person-days per hectare for the main crop, maize, and for soybean, cotton, groundnuts and sunflower under the null hypotheses of no difference. The results show that the area under maize changed significantly, as did the number of person-days spent on maize per farm and per hectare. In fact the decline in area under maize is significant[9] as are the rises in person-days spent per farm[10] and per hectare.[11] It cannot be concluded, however, without more data and study, that the move of farmers into paprika causes these changes. Nothing much changed for soybean other than the number of person-days per hectare, which has significantly risen, but the small sample makes the result unreliable.[12] None of the other crops are affected.

9 TEST OF MU = 0.000 VS MU L.T. 0.000: t = -2.50, p = 0.0078.
10 TEST OF MU = 0.0 VS MU G.T. 0.0: t = 2.51, p = 0.0079.
11 TEST OF MU = 0.0 VS MU G.T. 0.0: t = 3.52, p = 0.0006.
12 TEST OF MU = 0.0 VS MU G.T. 0.0: p = 3.22, p = 0.012.

In areas where paprika is grown, cotton- and soybean-buying activities are also found. Paprika competes for farmers growing other cash crops. The greater the presence of paprika buyers, the greater the likelihood of farmers switching to paprika and, to some extent, the presence of buyers must be a function of the financial support the industry is receiving from the Support to Farmer Associations Project (SFAP) and agencies.

**Table 10. Results of t-tests on changes in planted area, male and female labour, number of person-days and number of person-days per hectare for the main crop, maize, and for soybean, cotton, groundnuts and sunflower under the null hypotheses of no difference**

| | Changes, before and after paprika | | | | | |
|---|---|---|---|---|---|---|
| | n | Mean | StDev | SEMean | t-statistic | p value |
| | | | **Maize** | | | |
| Hectares | 53 | -0,481 | 1,4 | 0,192 | -2,5 | 0,016 |
| Male | 53 | 0,057 | 0,663 | 0,091 | 0,62 | 0,54 |
| Female | 53 | 0,075 | 1,385 | 0,19 | 0,4 | 0,69 |
| Person-day(s) | 44 | 123,523 | 326,315 | 49,194 | 2,51 | 0,016 |
| Person-day(s)/ha | 40 | 80,991 | 145,483 | 23,003 | 3,52 | 0,0011 |
| | | | **Soybean** | | | |
| Hectares | 6 | -0,417 | 1,021 | 0,417 | -1 | 0,36 |
| Male | 6 | 0,167 | 0,408 | 0,167 | 1 | 0,36 |
| Female | 6 | 0,5 | 1,225 | 0,5 | 1 | 0,36 |
| Person-day(s) | 6 | 5 | 207,147 | 84,568 | 0,06 | 0,96 |
| Person-day(s)/ha | 6 | 88,333 | 67,281 | 27,467 | 3,22 | 0,024 |
| | | | **Cotton** | | | |
| Hectares | 34 | 0,279 | 1,366 | 0,234 | 1,19 | 0,24 |
| Male | 34 | 0,206 | 1,067 | 0,183 | 1,13 | 0,27 |
| Female | 34 | 0,029 | 1,8 | 0,309 | 0,1 | 0,92 |
| Person-day(s) | 26 | 16,538 | 156,157 | 30,625 | 0,54 | 0,59 |
| Person-day(s)/ha | 27 | -1,015 | 117,184 | 22,552 | -0,05 | 0,96 |
| | | | **Groundnuts** | | | |
| Hectares | 13 | 0,154 | 0,591 | 0,164 | 0,94 | 0,37 |
| Male | 13 | 0,077 | 0,641 | 0,178 | 0,43 | 0,67 |
| Female | 13 | 0,077 | 1,188 | 0,329 | 0,23 | 0,82 |
| Person-day(s) | 11 | 39,545 | 202,562 | 61,075 | 0,65 | 0,53 |
| Person-day(s)/ha | 12 | 5,333 | 239,731 | 69,204 | 0,08 | 0,94 |
| | | | **Sunflower** | | | |
| Hectares | 10 | 0,525 | 1,805 | 0,571 | 0,92 | 0,38 |
| Male | 10 | -0,1 | 0,568 | 0,18 | -0,56 | 0,59 |
| Female | 10 | -0,6 | 2,271 | 0,718 | -0,84 | 0,42 |
| Person-day(s) | 8 | -63,25 | 96,534 | 34,13 | -1,85 | 0,11 |
| Person-day(s)/ha | 9 | -2,444 | 58,477 | 19,492 | -0,13 | 0,9 |

Table 11. Distribution of labour in paprika production. On average, small-scale farmers use 124 person-days per hectare of paprika, with a standard deviation of 76

person-days. The median is even lower, 96 person-days, suggesting that most farmers do not expend a lot of energy on this cash crop. Although land preparation appears to be done predominantly by women (55 percent), there is no significant difference and both men and women are equally involved. This is not the case for transplanting, which is a significant women's activity (61 percent). Cultivation and reaping, on the other hand, is significantly men's work: men undertake 63 and 64 percent of the work respectively. Fifty-three percent of destalking and deseeding is done by women. Both are involved equally in the drying and grading process, but men are exclusively involved in the baling work. On average, in all the activities, the work is well distributed, with 49 percent of the work done by men and 51 percent by women, and there is no significant difference between them.

## Table 11. Distribution of labour in paprika production

| | Labour distribution in paprika | | | | | |
|---|---|---|---|---|---|---|
| | Male | Female | Male (%) | t | p | df |
| Land preparation | 3,145 | 3,855 | 45% | -1,82 | 0,071 | 104 |
| Transplanting | 3,655 | 5,691 | 39% | -3,58 | 0,0005 | 92 |
| Cultivation/spraying | 2,818 | 1,673 | 63% | 3,02 | 0,0032 | 99 |
| Reaping | 2,273 | 1,291 | 64% | 2,68 | 0,0085 | 105 |
| Destalking/deseeding | 1,982 | 3,145 | 39% | -2,27 | 0,026 | 83 |
| Drying/grading | 2,400 | 2,727 | 47% | -0,99 | 0,33 | 94 |
| Baling | 2,404 | 1,173 | 67% | 4,4 | 0 | 101 |
| Mean | 2,649 | 2,784 | 49% | -0,59 | 0,56 | 107 |

Crop management is a crucial factor in achieving the high yields, but even the low-yield system offers relatively attractive returns.[13] Management skills are more complicated than those required for cotton, but similar to or slightly less onerous than those required for tobacco. Hence, where farmers have those existing skills, diversification into paprika is more straightforward. In addition to cultivation, the farmers need to be able to dry the pods by constructing drying racks, and need to learn how to grade their crops in accordance with the recognized ASTA system.

While management skills are relatively high for paprika, the crop provides a better return on labour input, in other words less hectarage is required to produce the same income as, say, cotton, and therefore the crop is suitable where there is a shortage of labour, in woman-headed households, for example.[14]

13 "Findings of the Joint MACO/ZNFU Study on Agriculture Sector Competitiveness and Impact of the COMESA Free Trade Area", Agricultural Consultative Forum, February 2002.

14 A number of interviewees have asserted that woman-headed households are short on labour resources. A Conservation Farming Unit study of 330 normal, rural households finds that woman-headed households do indeed have significantly fewer labour resources: 4.3 equivalent person-days as opposed to 4.74 equivalent person-days for man-headed households. But it must be doubted that this difference has an impact to the extent implied. (Langmead, P. In preparation. "Farmer Profiles", Conservation Farming Unit, Lusaka).

## 2.6 Utilization and distribution of incremental income

Table 12. Husband and wife incomes before and after paprika. Husbands reported a mean income of ZMK 1 914 907 (US$ 399) per annum before they started growing paprika, with a standard deviation of ZMK 4 004 481 (US$ 834). The median is probably a better reflection of normal incomes, showing most farmers receiving in the region of ZMK 800 000 (US$ 167). After adopting paprika, husbands claimed to have increased their mean incomes to ZMK 2 535 741 (US$ 528), with a corresponding increase in standard deviation to ZMK 5 015 949 (US$ 1 045); the median also rose, to ZMK 1 250 000 (US$ 260).

Wives also reported increased incomes, from ZMK 399 057 (US$ 83) before growing paprika to ZMK 608 264 (US$ 127) afterwards, with standard deviations of ZMK 548 292 (US$ 114) and ZMK 600 696 (US$ 125) respectively, and a median of ZMK 250 000 (US$ 52) rising to ZMK 450 000 (US$ 94).

Using the medians, the results suggest a total increase in family income of ZMK 650 000 from an increase in revenue of ZMK 1 million from 0.5 ha, which does not seem wildly out assuming that household labour is not a direct cost.

The t-test, with null hypotheses that the incomes of husbands and wives are greater after adopting paprika, fails to be rejected with t-statistics of 3.23 and 3.5 respectively. Although high variance may suggest some exaggeration, Wilcoxon tests concur with the parametric tests.

Anecdotal evidence suggests that, in general, working women in rural areas earn less than men, who also assume ownership of the earnings of their wives and children. There is some evidence that men are more productive: for example, weeding a lima may take four man-days or six woman-days, but the important feature is that the price for the job remains the same whoever does the work. The difference in time taken by women seems to be due to the needs of their children rather than physical capability.

Some 24 percent of rural households in Zambia are headed by women, and there is evidence that their incomes are lower than their male counterparts, but contractual agreements for paprika, or for that matter any other cash crop, are based on a market price rather than gender.

## Table 12. Husband and wife incomes before and after paprika

| | Wealth distribution | | | |
|---|---|---|---|---|
| | Before paprika | | After | |
| | **Husband** | **Wife** | **Husband** | **Wife** |
| Mean | K1.914.907 | K399.057 | K2.535.741 | K608.264 |
| Median | K800.000 | K250.000 | K1.250.000 | K450.000 |
| StDev | K4.044.481 | K548.292 | K5.015.949 | K600.696 |
| Max | K22.000.000 | K3.500.000 | K28.000.000 | K2.500.000 |
| Min | K75.000 | K0 | K150.000 | K0 |
| N | 54 | 53 | 54 | 53 |
| t-statistic | | | 3,23 | 3,5 |
| p value | | | 0,0011 | 0,0005 |

Table 13. How correspondents would prefer to spend available cash. Men's and women's priorities are not the same, and it depends who has the money. Men prefer to spend their money on, first, agricultural implements (10.97%), followed by inputs (10.86%) and school costs (6.08%). Women on the other hand prefer to spend their extra income on clothing (13.65%), followed by kitchen utensils (10.78%) and inputs (7.64%). If any joint decisions are made, then the money would be spent on inputs (18.5%).

## Table 13. How correspondents would prefer to spend available cash

| | Weighted preferences for purchases | | |
|---|---|---|---|
| | **Male** | **Female** | **Total** |
| Farm equipment | 10,97% | 1,03% | 11,99% |
| Inputs | 10,86% | 7,64% | 18,50% |
| School costs | 6,08% | 4,76% | 10,84% |
| Other | 4,64% | 1,18% | 5,83% |
| Food | 3,86% | 5,42% | 9,27% |
| Livestock | 3,71% | 1,32% | 5,03% |
| Furnishings | 3,05% | 3,08% | 6,13% |
| Clothes | 2,84% | 13,65% | 16,49% |
| Oxen | 2,15% | 0,32% | 2,47% |
| Bicycle | 1,84% | 0,00% | 1,84% |
| Kitchen utensils | 0,00% | 10,78% | 10,78% |
| Poultry | 0,00% | 0,83% | 0,83% |

## 2.7 Small-scale farmer opinions

Table 14. Rating of comments by small-scale farmers on the advantages and disadvantages of growing paprika. The most important consideration was lower labour needs, which is the belief that growing paprika requires less labour than, in particular, cotton. The second comment is that paprika appears to have a good market, which means that farmers believe that they can easily sell their produce, which also suggests the substantial presence of paprika buyers.

Input credit is seen as being important generally, but few agencies provide more than just seeds, because of the well-observed risk of fertilizer being applied to their maize; farmers remain hopeful, however. The paprika *nursery* is seen as tiresome, difficult and inconvenient, in comparison with cotton, which is the crop's direct competitor and does not need a nursery.

The need for inputs for some farmers was much more, but for others less, than other cash crops, presumably cotton. The contradiction is explained by paprika needing as many inputs as cotton if inputs are to be used, but paprika having a better return in the absence of inputs. Farmers perceive paprika as being more profitable in cash terms than other cash crops, and it seems that some farmers are aware that the growing period can be substantially extended with irrigation.

**Table 14. Rating of comments by small-scale farmers on the advantages and disadvantages of growing paprika**

| Rating of comments | Score |
|---|---|
| Lower labour need | 9 |
| Good market | 9 |
| Input credit desirable | 6 |
| Nursery difficult | 5 |
| Profitable | 5 |
| Needs inputs | 4 |
| Fewer inputs needed | 4 |
| Needs water | 4 |

# 3. Market structure

## 3.1 Product quality

The quality of paprika is key to its value, and is graded by the industry in terms of ASTA value. Moisture content is also a factor in pricing. Quality is an area in which particular attention could be paid in order to improve smallholder farmer incomes. Difficulty in assessing ASTA values at the smallholder farmer level has led to the introduction by traders of a simplified grading system that divides paprika into four groups, A, B, C, and D, based on a visual inspection of colour for the purposes of pricing to farmers. The paprika may then be examined more closely under laboratory conditions to determine its ASTA value and prices may be adjusted accordingly. Seasonal variations affect quality levels, with pods produced early, in January, tending to be top grade. Average skin ASTA values for Zambia in 2002 were reported to be 280, with a season average starting at 330 in April and declining to 230 by October. The second crop, from September to November, averaged 300 ASTA. The 2001 average level of 250 was considered particularly low and attributed to poor rainfall.[15]

15 Mark Terken, managing director, Cheetah Zambia Ltd.

Anomalies exist between expected and reported quality, with Biopest, for example, reporting that most of its purchases are of the A/B grade, with very little C/D. This may be attributed to a distinction between quality produced and actually bought. Sixty-one percent of the crop was baled as A grade and 4 percent was grade C, delivered loose. The remaining 35 percent was seed.

**Table 15. Quantities of each grade of paprika produced by Biopest Company Ltd in the 2001/02 season**

| Grade | Biopest grading, 2001/2 Tonnes | Percentage |
|---|---|---|
| Grade A - baled | 17.288 | 61% |
| Grade A - loose | 22 | 0% |
| Grade B, combined with A | 0 | 0% |
| Grade C - baled | 0 | 0% |
| Grade C - loose | 1.084 | 4% |
| Seed | 9.818 | 35% |
| Total | 28.211 | 100% |

Grading is a key area of conflict between farmers and buyers, with a number of commercial farmers withdrawing from the market amid claims of unfair grading. The farmer and buying representative generally agree on the grade on a subjective basis in the field, but the grade may be changed subsequently following a more scientific analysis once the paprika reaches the factory. In order to mitigate problems with grading, Cheetah has introduced a banding structure under which it pays a single price for grade A/B and for grade C/D. The grading process remains, however, an example of asymmetric information, where farmers are at the mercy of unscrupulous buyers. One example is that of Tanwood, a Zambian company established by the Spanish processor Evesa, which accounts for an estimated 90 percent of worldwide paprika sales. In 1989/99 it was alleged that ASTA levels had apparently been downgraded by as much as 30 percent. When challenged, the parent company withdrew pre-season credit support and the Zambian company subsequently collapsed.

A range of factors affects the ASTA levels achieved by farmers. Seed quality can affect grading and is often compromised by being recycled; some traders are reported to distribute non-certified seed. Cheetah uses seed either from the United States or produced in Zambia under contract to the company. Biopest maintains that some farmers recycle their own seed, resulting in poor quality crops and a bad reputation for Zambian producers. Cheetah supplies seed certified by the Seed Control and Certification Institute and emphasizes the importance of good-quality seed in achieving high yields and good ASTA levels. Cheetah used to conduct variety trials to develop improved seed, but has stopped because of the expense. ZAHVAC members also use seed certified by the Seed Control and Certification Institute and grown

locally under contract. ZAHVAC is planning to start seed research and multiplication in a venture with Hygrotech.

The varieties grown in Zambia include Cheetah's own varieties, CP 133, 134 and 212, and Papri-Queen, Papri-King and Papri-Ace, which are considered high quality and can command relatively high prices under good management. Papri-Queen is more disease resistant, but lower-yielding than Papri-King, so more appropriate for small-scale farmers.[16] Problems in 2000 and 2001 were reported with Papri-Queen seed, which was blamed for problems in uniformity, pungency and yield, and other players report a "genetic shift" in seed that is leading to deterioration in quality.[17]

Poor quality or recycled seed results in a large variation in plants within a given field, often with a mixture of varieties, and undesirable pungency increases, with the paprika becoming 'hotter' with each successive replanting. The use of uncertified or poor-quality seed is hampering industry development.[18]

Pungency and aflatoxins are the two main quality problems facing the industry in Zambia. While oleoresin processing, being a microbiological process, controls or reduces pungency problems, it concentrates aflatoxin levels. In addition to seed quality, paprika quality and yield can be adversely affected by damping off in the nursery stage; insects such as aphids, cutworms, thrips, whitefly and bollworms; diseases such as leaf spot, powdery mildew; and nematodes and rodents.

Combinations of nutrients, temperature and watering practice have a bearing on quality, as do drying techniques, particularly sun drying, while storage also reduces the value, with colour content dropping by around 4 percent per month of storage. Colour quality in Zambia is estimated to be 20 percent lower than that in Zimbabwe, where, with better management, yields reach 10 tonnes/ha.[19]

There are concerns in the industry about Zambia acquiring a reputation internationally for poor quality, and a South African buyer rejected two consignments of paprika at the end of 2001.

## 3.2 Competing crops

Once farmers have made the decision to diversify into a cash crop, the choice of crop is ultimately governed by perceptions of absolute returns, within the bounds of available resources for investment. In terms of profitability, paprika is considered particularly attractive, along with cotton and tobacco. Fluctuating international prices for crops are thus likely to influence the relative attractiveness of each in any given season – albeit with a lag, given the absence of forward pricing at farm-gate in Zambia, particularly in the paprika industry. Attractive returns may be outweighed by

16 Collins Chitambaka, executive secretary, ZAHVAC.
17 Catherine Mwanamwamba, Agribim Ltd.
18 Mark Terken, managing director, Cheetah Zambia Ltd.
19 Ibid.

high initial input costs and length of time to maturity, and thus increased risk, unless that risk can be mitigated, for example by well-structured outgrower schemes and/or input credit.

Taking the median yield and average price from the paprika survey of small-scale farmers, the revenue is US$ 437/ha. The direct costs are input costs and indirect costs are 204 household labour days. It is important to observe that direct costs must be paid and that household labour is a fixed cost and not incremental. Paprika therefore has the lowest direct costs of the three competing cash crops. The profit[20] is US$ 250, a profit margin of 57 percent and a return on labour of US$ 1.23.

The conservative yield from smallholder cotton is 600 kg/ha, with a price last year of 60 cents, earning revenues of US$ 360. The direct cost of the inputs is US$ 122 and the cost of 234 household labour days is US$ 117, yielding a profit of US$ 121, a profitability of 34 percent and a return on labour of US$ 0.52. This is consistent with the general feeling that paprika uses fewer inputs and has a lower labour need than cotton. However, it is interesting to note that the area of cotton farming has not diminished, which is in line with the observation that changing the *status quo* is more easily proposed than accomplished, and usually more expensive than expected. Tobacco is known for its high returns, but then its direct costs and labour costs are considerably above those of both paprika and cotton. The profit is greater and the return to labour is higher, but so are the input costs and labour.[21]

In summary, the revenue from paprika is higher than cotton while the direct costs and labour needs are lower than both cotton and tobacco; but it remains less profitable than tobacco. Paprika is therefore a competitive crop, but as with any new idea, there is inertia slowing change.

## Table 16. Comparative attractiveness of paprika, cotton and tobacco for small-scale farmers

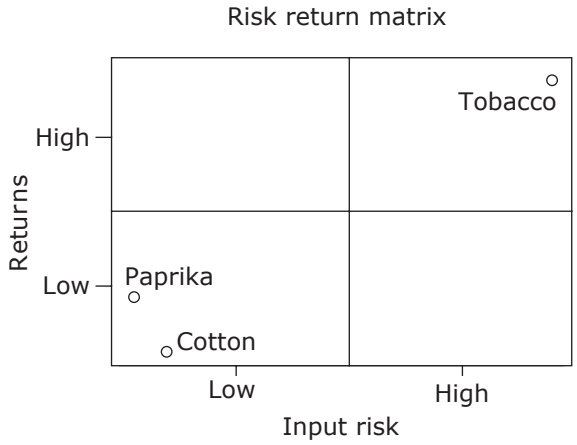
| | Paprika | Competing crops Cotton | Tobacco |
|---|---|---|---|
| Yield, kg | 800 | 600 | 1 000 |
| Price/kg | US$ 0,55 | US$ 0,60 | US$ 1,50 |
| Revenue | US$ 436,95 | US$ 360,00 | US$1.500,00 |
| Direct costs | US$ 81,15 | US$ 122,00 | US$ 600,00 |
| Indirect costs | US$ 105,75 | US$ 117,00 | US$ 140,00 |
| Profit | US$ 250,05 | US$ 121,00 | US$ 760,00 |
| Profitability | 57% | 34% | 51% |
| Labour | 204 | 234 | 280 |
| Return on labour | US$ 1,23 | US$ 0,52 | US$ 2,71 |

20 These figures do not include the opportunity cost of the investment included in table 4 on page 8.
21 The data are from the Tobacco Association of Zambia.

Figure 3. Input risk/return matrix for paprika, cotton and tobacc. The input risk, defined as cash expenditure, is lower for paprika than it is for either cotton or tobacco. In terms of returns, tobacco is the highest, followed by paprika; cotton has the lowest return. In the absence of more complex analysis and more data, it appears that paprika has the best risk return profile, with the caveat that it is more prone to disease and more susceptible to high rainfall than cotton, but less drought-tolerant than tobacco. It is more intensive to handle than maize, less than cotton, but easier to manage than tobacco.

Paprika is considered well suited to small-scale production because it does not necessarily require irrigation and uses skills with which farmers are already familiar, particularly in the Eastern Province tobacco-growing areas,[22] but it cannot be used as a rotation crop with tobacco.

**Figure 3. Input risk/return matrix for paprika, cotton and tobacco**

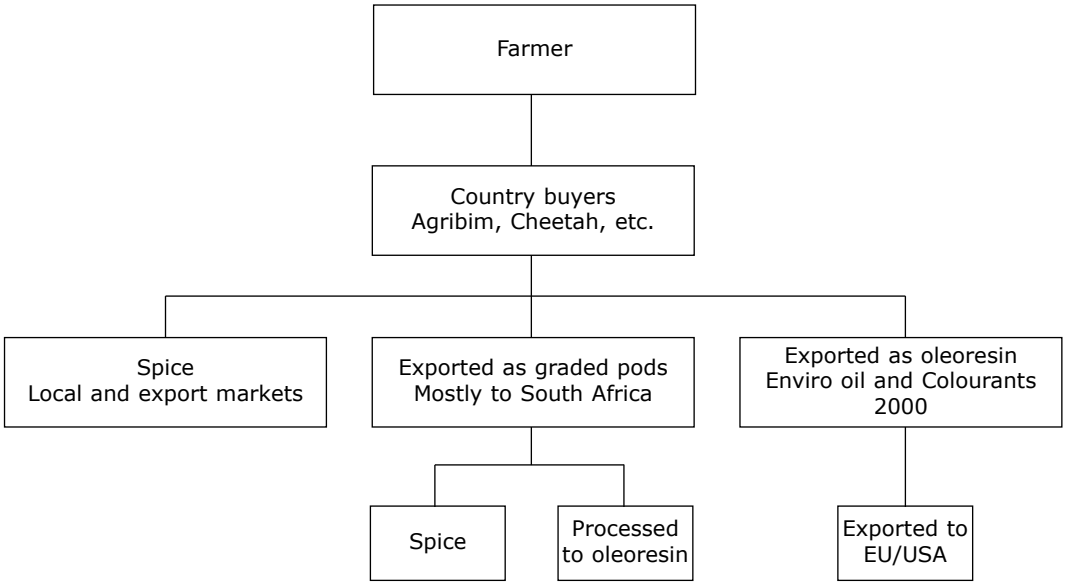



## 3.3 ZAMBIAN MARKET STRUCTURE

Farmers tend to grow under contract to buyers or traders in Zambia, who then deseed and bale the paprika prior to export. . Country buyers export spice, graded pods and oleoresin. There is also a local market for spice worth US$ 30 000-50 000. Exported pods are processed into spice and oleoresin. Oleoresin can be cracked into a greater range of colours, and can be mixed with other oils for further use.

22 Keyser, J., Heslop, T. and Abel, J. "Trade and Investment Opportunities in Agriculture", Trade and Investment Enhancement Project (ZAMTIE), October 2001.

**Figure 4. Marketing infrastructure**




Most of the paprika grown in Zambia is purchased by one of seven companies, which then on-sell overseas. Cheetah is the largest; the remaining six are all members of the Zambia Association of High-Value-Added Crops (ZAHVAC), which processes and markets the paprika on behalf of its members, and has strong political connections. Those six are Enviro Oils, Agribim, Biopest, Mipachima, Steadfast and White Rose.

The Central Growers Association (CGA), part of the Zambia National Farmers' Union (ZNFU), is also a buyer, while CLUSA has recently pulled-out of commercial activity, but still provides extension advice. In addition, a commercial farm, Chakanaka, accounts for a large volume of exports.

Table 17. Main paprika buyers in Zambia, number of farmers they have under contract and estimated tonnage for 2002/03. Cheetah has the largest number of small-scale farmers, followed by Agribim; the remaining operators are substantially smaller. Most provide inputs and extension services.

## Table 17. Main paprika buyers in Zambia, number of farmers they have under contract and estimated tonnage for 2002/03

| Year 2002 | Process | Growers | Tonnes | Inputs | Extension |
|---|---|---|---|---|---|
| Cheetah | Deseeding and baling; powder | 8 000 | 1 200 | Seed,chemicals | x |
| Agribim | Deseeding and baling; powder; oleoresin | 2 500 | 1 000 | Seed, chemicals | x |
| Biopest | Deseeding and baling | 676 | 440 | Seed, chemicals, fertilizer | x |
| Mipachima | Deseeding and baling | 800 | n/a | Seed, chemicals, fertilizer | x |
| Steadfast | Deseeding and baling | 400-600 | n/a | Seed, chemicals, fertilizer | x |
| White Rose | Deseeding and baling | 200 | n/a | Seed, chemicals, fertilizer | x |
| CHC Commodities Ltd | Re-grading and baling, commercial farmers only | n/a | 250 | Seed, chemicals, fertilizer | |
| Central Growers Association | n/a | 153 | 76 | Seed | |

These buyers are the linchpins of the paprika industry in Zambia, promoting cultivation by small-scale farmers and providing a ready market for their crop. Their survival and profitability are crucial to the livelihoods and confidence of paprika farmers. The collapse in 2002 of Masstock Ltd, which traded in a range of crops, including paprika and maize, left a number of farmers unpaid and had a secondary effect on other parts of the agricultural sector. Its exposure to paprika farmers was fortunately relatively small, however, having only started contractual arrangements in 2001 and buying less than 100 tonnes. Masstock also grew paprika on its own farm, with production rising from 70 ha in 1999 to 600 ha in 2001, but with yields dropping from 3 tonnes/ha to 1.6 tonnes/ha.

Most paprika production in Zambia involves the baling of dry, deseeded pods, which are exported for processing in South Africa. However, a grinding mill plant has now been installed by Cheetah to produce powder, and Enviro Oils is rehabilitating its oleoresin plant. This adds value locally.

Table 18. Claimed levels of production for the main exporters since 1999. It is estimated that in 2001, 2 450 tonnes of paprika were produced. This fell dramatically in 2002 following poor rainfall, particularly in Southern Province. This year, 2003, the production is expected to reach 2 250 tonnes.

## Table 18. Claimed levels of production for the main exporters since 1999

| Tonnes | Affiliation | 1999 | 2000 | 2001 | 2002 | 2003E |
|---|---|---|---|---|---|---|
| Cheetah Zambia | | 800 | 250 | 450 | 700 | 1 200 |
| Agribim | ZAHVAC | | | | | |
| Biopest | ZAHVAC | | | | | |
| Mipachima | ZAHVAC | 250 | 300 | 700 | 400 | 500 |
| Steadfast | ZAHVAC | | | | | |
| White Rose | ZAHVAC | | | | | |
| Chakanaka | | 150 | 200 | 150 | 200 | 200 |
| Masstock | | 200 | 500 | 1 100 | 0 | 0 |
| Tanwood | | 50 | 0 | 0 | 0 | 0 |
| CHC | | 0 | 0 | 0 | 100 | 250 |
| Other | | 150 | 50 | 50 | 50 | 100 |
| TOTAL | | 1 600 | 1 300 | 3 350-3 650 | 1 980 | 3 250 |

Source: Cheetah Zambia Ltd

The oleoresin plant produces paprika oil used as a food colourant, which has an annual worldwide demand of 240 tonnes. Some 4 800 tonnes of dry, deseeded paprika is required to produce that quantity of oil.[23] The plant requires constant throughput of paprika in order to be cost-effective, because repeated shut-downs and start-ups are expensive. Thus there is a tendency to use lower-quality raw material rather than stop processing altogether. This has led to concerns about falling quality standards, to the detriment of trade in dry paprika pods.[24] Other reports, however, say that there are plans to import paprika from the company's operations in Malawi and Mozambique in order to keep the plant running.[25]

The plant is now being refurbished with funding from the PTA Bank (Eastern and Southern African Trade and Development Bank) and Japanese non-project grant aid and is expected to be operational in early 2003. It is expected that most of the crop produced by ZAHVAC's five members, estimated at 1 500 tonnes by ZAHVAC, would be channeled into the plant once operational, with more than 100 tonnes of oleoresin being produced annually. However, the plant has a capacity of 2 000 tonnes per year. The increased demand is expected to push prices up to ZMK 3 000/kg.[26] An irrigation scheme being promoted by ZAHVAC is also expected to produce additional production if successful.

23 Keyser, J., Heslop, T. and Abel, J. "Trade and Investment Opportunities in Agriculture", Trade and Investment Enhancement Project (ZAMTIE), October 2001.
24 Ibid.
25 Saasa, O., Chiwele, D., Mwape, F. and Kayser, J. "Comparative Economic Advantage of Alternative Agricultural Production Activities in Zambia". USAID Africa Bureau, December 1999.
26 Collins Chitambaka, executive secretary, ZAHVAC.

It is also reported that the original feasibility study for the oleoresin plant ten years ago was based on the assumption of an oleoresin price of US$ 40-45/kg, while the current market price is around US$ 24-25, and unlikely to rise because of the increase in production from India. It is thus considered viable only if donor support continues. Enviro Oils clarified that the feasibility study assumptions had been reconsidered to US$ 25 at the time.

Much production is grown under quasi-outgrower schemes, perhaps better described as contract arrangements, under which farmers sign agreements at the beginning of the season to supply a specified amount of paprika pods. In return they are supplied with inputs, either for cash or on credit, and extension advice. The starter packs are for one lima. Contract details, described fully in section  on page , must compete with other commercial outgrower contracts; cotton contracts are particularly well developed.

The essential requirement for potential paprika growers is the presence of commercial buyer activities. If buyers are present, extension advice and some degree of input credit will be available. Paprika is usually found alongside other cash crops, because buyers recognize that farmers in those areas have some understanding of commercial practice, which reduces supply risk for the buyer.

Reluctance on the part of buyers to specify a fixed price at the start of the season has increased uncertainty, however, as has disagreement over grading. Cheetah declined to reveal its price for fear of alerting the competition, while Biopest has set its minimum contract price at ZMK 2 800/kg.

As a rule of thumb, current farmer prices are around ZMK 2 800/kg for Grade A and ZMK 2 000 for Grade B/C. ZAHVAC does not buy Grade D material, and the majority of its purchases, 70 percent, are Grade A.[27]

## 3.4 Buyer profiles

Claims of production by buyers in this section have not been independently verified.

**Cheetah Zambia Ltd** set up business in Zambia in 1993 and is a subsidiary of a Netherlands-based company that also operates in Malawi and Mozambique. The company is the largest buyer and exporter of paprika in Zambia. After cleaning, grading and standardizing, Cheetah processes paprika in one of two ways: either it is deseeded and sold as "flake" or it is recombined with the seed and ground into powder.[28]

27 Ibid.
28 Mark Terken, managing director, Cheetah Zambia Ltd.

**Enviro Oils and Colourants Ltd** was founded in the early 1990s as a joint venture to develop an oleoresin solvent extraction process in Zambia. Finance was forthcoming from the Japanese Government and a contract agreed with Masstock Ltd, since liquidated, for the processing of marigolds. However, processing of the marigolds corroded the mild steel plant, and operations ceased in 1996. The plant is now being refurbished and is expected to be operational in early 2003. It is expected that most of the crop produced by ZAHVAC's five members, estimated at 1 500 tonnes, would be channeled into the plant once operational.

**Agribim Company Ltd** is the agribusiness side of Enviro Oils. It buys paprika from outgrowers and is a member of ZAHVAC, working closely with other members. In 2001/02 the company reported having 3 000 small-scale farmers growing 1 to 2 limas each and producing 250-500 kg. Total production was 180 tonnes. The company has a further 30 emergent farmers with plots of 1-5 ha, yielding 1.5 tonnes and producing a total of 50 tonnes, and two commercial farmers getting yields of 3.5-4 tonnes/ha and between them producing 300 tonnes, resulting in a total for the company of 530 tonnes, a poor quantity blamed on that year's drought. The previous year, Agribim had the same number of farmers, 1 500 ha and produced 1 200 tonnes.

For 2002/03, the company expected to have 2 500 farmers, 1 500 ha and total production of 1 000 tonnes. Agribim expects to start powder spice production in August 2003, and estimates the local market to be 30 000-50 000 kg per year. It employs 147 distributors and 30 extension staff.

**Biopest Company Ltd** is a member of ZAHVAC and was set up in 1993, initially as a home-pest-control company. In 1994 the company diversified into paprika, with a remit to train farmers and supply inputs with a development project objective. The company is one of the five paprika-trading members of ZAHVAC that operate on a similar basis of supplying inputs and training, and guaranteeing to buy from farmers. Processing and marketing is then pooled under ZAHVAC.

Table 19. Number of groups and farmers and the hectarage under cultivation by farmers contracted to Biopest Company Ltd in 2002/03. There are a total of 676 farmers in 27 groups farming 440 ha in Chibombo, Kabwe and Chongwe.

## Table 19. Number of groups and farmers and the hectarage under cultivation by farmers contracted to Biopest Company Ltd in 2002/03

| Area | Groups | Farmers | Hectares |
|---|---|---|---|
| Chibombo | 5 | 200 | 90 |
| Kabwe | 17 | 350 | 259 |
| Chongwe | 5 | 126 | 91 |
| Total | 27 | 676 | 440 |

Source: ZAHVAC

Initially the company encouraged farmers to grow just 1 lima of paprika, but that has gradually increased and the minimum is now 2 limas, with a handful of the largest farmers growing 2 ha. The average is 1 ha. The company's farmers have been hit by poor yields in recent years due to drought and the short supply of fertilizer. The average has been 350 kg/ha, although a few farmers have achieved production of a tonne.

**Mipachima Ltd** is a pioneer member of ZAHVAC and has around 800 small-scale farmers growing approximately 260 ha in Mgula, near Kabwe. Again, the company supplies seed, chemical and fertilizer on credit.

**Steadfast Ltd** is a member of ZAHVAC and emphasizes the development aspect of its work, introducing an HIV/AIDS component to its operations, which are based in Monze, Southern Province, where it has around 400-600 farmers cultivating 200 ha of paprika.

**White Rose Ltd**, also a member of ZAHVAC, has contracts with 200 farmers covering 100 ha in Lusaka West.

**CHC Commodities Ltd** buys solely from commercial farmers. Last year it purchased 100 tonnes and has only two enquiries for this year. It regrads, bales and sends the product to its Spanish partner, *El Plarin*. It provides input finance and guarantees fixed prices at the beginning of the season: US$ 1.50 for grade A, US$ 0.85 for grade B, US$ 0.45 for grade C, there is no grade D, and seed is US$ 0.20.[29]

The **Central Growers Association** (CGA) is an independent producer association that facilitates the sale of produce and supplies seed on credit, but not chemicals or fertilizer. This year (2002/3 season), it has 153 small-scale farmers growing paprika on 108 ha and is expecting an average yield of 700 to 800kg/ha. It facilitates a contract with a South African buyer that supplies seed and a minimum price of US$ 0.80 for grade A. This season is GCA's second year in the paprika business. Last year it had 50 outgrowers on 28 ha that produced 2 tonnes, which were not sold. Originally, it worked with Tanwood, which collapsed, but is now seeking assistance from SFAP for funding inputs to support its farmers.[30]

## 3.5 Business arrangements and contracts

Buyers tend to source raw material through farmer cooperatives and associations, although Cheetah tends to have contractual agreements with individual farmers, while ZAHVAC members contract with farmer groups.

29 Chris Hawke, director of CHC Commodities Ltd.
30 Veriwick Mungabo, programme facilitator, CGA.

Fierce competition between buyers, fuelled by stiff purchase targets for representatives, has led to significant "side-buying" of crops already subject to purchase agreements with rival traders. In addition to local buyers, there are also overseas agents buying in the market.[31] Attempts are now being made to introduce standards into the market with the formation of the Association of Smallholder Service Providers (ASHSP), supported by the Smallholder Enterprise and Marketing Programme (SHEMP). ASHSP, whose members include Cheetah and ZAHVAC, has drawn up a code of conduct aimed at promoting ethical and transparent trading between buyers and small-scale farmers. Other possible solutions to the side-buying problem include the establishment of a revolving input fund financed by a levy on exports.[32] Biopest claims it has few problems with side-buying because it has created a rapport and relationship with its farmers.[33] It also claims that by structuring its operations into consolidated operational groups. the members act as watchdogs on each other. Ultimately, however, the temptation is great for a farmer to sell to another buyer who is offering a higher price, and the strength of such market forces makes it difficult to stop such practices. It is argued that when buyers "get greedy" and offer a lower price, their crop will be susceptible to side-buying.[34] There can be no side-buying without side-selling, however, and there is an additional incentive for farmers to sell elsewhere when the company to whom they are contracted will also deduct any loan repayments due on inputs, thus reducing the cash received further. Any delay in payment to the farmer exacerbates the problem, undermining the relationship between farmer and buyer and increasing the temptation to sell elsewhere.

Cheetah signs up contract farmers at the start of the season, quoting them the minimum price they will pay at harvest. Farmers can opt to be paid either on the basis of grades or ASTA value. Smallholders' paprika is usually assessed on the basis of one of four grades. For the 2002/03 season Cheetah signed some 8 000 contracts. It has a standard "Paprika Production Agreement", printed in triplicate. The farmer, the field manager and the Head Office Lusaka each receive a copy. Under the contract, the grower must grow 1 lima with a yield of at least 150 kg/lima. All product from the lima meeting the required quality must be sold to Cheetah, and failure to do so incurs a penalty of ZMK 1 000/kg (US$ 0.21/kg). The company agrees to provide, to the best of its ability, horticultural advice and supporting printed materials, site visits and field days, and to help improving quality, but does not take responsibility for production, harvesting and handling. The farmer must obtain written permission before using chemicals not listed in the company's paprika manual, recommendations must be adhered to, and spraying activities must be recorded on the chemical-spray record forms. The pods must be of the same variety, have chemical residues less than ASTA[35] required levels, be maroon/purple, red or orange in colour, be free of foreign

31 Keyser, J., Heslop, T. and Abel, J., "Trade and Investment Opportunities in Agriculture", Trade and Investment Enhancement Project (ZAMTIE), October 2001.
32 Ibid.
33 Criven Chimoga, project coordinator, Biopest Company Ltd.
34 Ibid.
35 American Spice Trade Association.

matter, be sweet and non-pungent, have a moisture content of between 10 and 13 percent, be free of mould and insects or insect eggs. Loose paprika seed must be yellow and clean, and loose stems green and free of disease. The grower must grade the pods into four grades:

| Grade | Description |
|---|---|
| A | Dark maroon/purple without damage. |
| B | Dark maroon/purple with no more than 25 percent spots or marks. |
| C | Red/maroon (without mould or disease) |
| D | Orange/red (without mould or disease) |

Cheetah has the right to downgrade or reject product that is not of the required quality and/or has excess chemical residue. If the rejected material is not collected within 30 days, it is disposed of. The pods are to be packed in 90-kg polypropylene bags;[36] the packed bags should weigh between 20 and 30 kg with the grade marked clearly on the bag. The minimum delivery quantity is 250 kg, to the warehouse in Lusaka. Payment for the pods is made within 15 days, credit is charged at 1.5 percent per month on the United States dollar equivalent. In practice, the contracts are not easily enforceable under the current judicial system. Collateral is not provided for and side-buying is rife in areas where there is competition among buyers.

Agribim requires membership of an association or group, with a ZMK 30 000 membership fee, and supplies seed and chemicals on credit. Biopest supplies inputs, seed, chemicals and fertilizer, on full credit, with no interest, but charges a 3 percent handling fee. In previous years contracts have been with farmer groups, but the company is now considering changing its strategy and signing-up individual farmers following meetings with stakeholders, including the Norwegian Agency for Development Cooperation (NORAD). Farmers were experiencing problems with delays in payment for their crops because of the time taken in grading small quantities of individual crops. Biopest is now paying spot cash, however, through a network of farmer distributors that act as buying agents and encourage farmers to consolidate and organize themselves to sell production as a group. The farmer distributors are given bicycles and also receive a commission based on loan recoveries, production and quality on a sliding scale, starting from 5 percent for 60-percent loan recoveries.

CLUSA used to buy from its small-scale farmers and sell product from Mumbwa district to Agribim. The product from its remaining operating areas was sold to Cheetah. CLUSA has now withdrawn from the commercial side of the market, but continues to provide training, sponsored by SHEMP. Its representatives also continue to act as agents on an individual basis, without direct involvement from CLUSA.

36 "90-kg bag" describes a generic bag size available in Zambia. The other available size is the "50-kg bag".

## 3.6 International market structure

Paprika ranks as the third most important spice traded globally and is used as both a food flavour and colourant.[37] It is sold as an oil-soluable oleoresin, water-solubilized extracts and as dried powders. It is widely used in sausages, sauces, snacks, relishes, salad dressings, coating crumb, soup mixes and processed cheese.[38] Paprika in powder form accounts for roughly 10 percent of Cheetah's production by volume, and its price is approximately 10 percent lower than flake, at around US$ 1.40-1.50/kg CIF Europe.[39]

Europe and the United States are the main markets, with South Africa also buying. The main buying companies conduct regular trips to the markets, dealing with customers on a personal basis. Cheetah, for example, makes three sales trips per year to Europe and one to the United States to ensure that they are fully conversant with market trends and developments, so that production can be tailored to demand.

The major suppliers of *capsicum peppers*, excluding sweet, crushed and ground, to the European Union in 2001 were South Africa 45.7 percent, Peru 25.7 percent, Zimbabwe 11.4 percent, Zambia 3.3 percent and China 3.23 percent. Others were 10.7 percent. The major markets in 2001 for paprika pod and spice, specifically***, as opposed to generic capsicum peppers,*** were Spain, 21 134 tonnes, United States 9 500 tonnes and Germany 980 tonnes. Japan possibly follows or leads Germany as an importer, because it is the fourth largest importer of generic *capsicum peppers*. The data are far from clear, because paprika is aggregated with all *capsicum peppers*; in the United States, paprika represents 19.5 percent of *capsicum* import value. Slightly more than 1 000 tonnes were exported in 2001 to the European Union with Zambia stated as the origin; 23.5 percent was crushed or ground and the remainder was whole pod. World demand is approximately 120 000 tonnes, of which Zambia produces 2 000 tonnes or 2 percent.[40] Table 20. Reported imports to the United States and European Union, and implied imports to South Africa. South Africa represents a significant market for Zambian paprika, accounting for around 20 percent of its sales. The data for United States and European imports are reliable, but the imports to South Africa are implied and rely on reported production data in Zambia, which are not reliable.

37 "Findings of the Joint MACO/ZNFU Study on Agriculture Sector Competitiveness and Impact of the COMESA Free Trade Area", the Agricultural Consultative Forum, February 2002.
38 Transfer, H.K., Lagemaat, A.J. and Oudenhoven, L., "Natural Food Colours and Flavours. A Compact Survey of The Netherlands and Other Major Markets in the European Union", Centre for the Promotion of Imports from Developing Countries, May 1999.
39 Mark Terken, managing director, Cheetah Zambia Ltd.
40 Ibid.

**Table 20. Reported imports to the United States and European Union, and implied imports to South Africa**

| | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| USA whole pods | | | 219 | |
| USA crushed/ground Capsicum | n/a | n/a | n/a | n/a |
| EU whole pods | 335 | 203 | 217 | 792 |
| EU crushed/ground | 135 | 46 | 103 | 243 |
| South Africa pods, 20% | n/a | 320 | 260 | 230 |
| Unexplained | | 1 031 | 501 | 885 |
| Total | | 1 600 | 1 300 | 2 150 |

The Zimbabwe situation could create a supply vacuum in South Africa that could be filled by Zambia, although reports of contracts reneged on have apparently damaged the reputations of Zambian traders there,[41] and two consignments from ZAHVAC were rejected because of poor quality.

Regionally, South Africa and Zimbabwe are producers, and Mozambique and Malawi are more recent entrants into the market, along with Zambia. India represents significant competition to African producers, particularly in terms of price. Zambia is not considered competitive by world standards, and still in need of strong support from donors and the government.[42] The answer is to improve yields and quality, rather than hectarage.[43]

The relatively small tonnage of world demand, coupled with paprika's high value, means the world market price can be highly sensitive to small fluctuations in output. However, according to World Bank figures interpreted by Zambia Trade and Investment Enhancement Project (ZAMTIE), prices can fall by 70 percent before a small-scale farmer is in a loss-making position, while a commercial farmer can only withstand a 40-percent drop in price before starting to have a loss. On the other hand, a dramatic increase in Zambian production would still represent only a small fraction of world output, and thus would be unlikely to impact overall market prices.

The recent political upheaval in Zimbabwe, which previously accounted for 10 percent of world production, has resulted in a fall in production from there, which also represents an opportunity for Zambia to make in-roads into the market, and could push up world prices.[44] Nevertheless, Zambia still cannot compete with

41 Keyser, J., Heslop, T. and Abel, J., "Trade and Investment Opportunities in Agriculture", Trade and Investment Enhancement Project (ZAMTIE), October 2001.
42 Criven Chimoga, project coordinator, Biopest Company Ltd.
43 Ibid.
44 Keyser, J., Heslop, T. and Abel, J., "Trade and Investment Opportunities in Agriculture", Trade and Investment Enhancement Project (ZAMTIE), October 2001.

Zimbabwe in terms of quality and price. Confusion surrounds the exact extent of Zimbabwean production, however. While official figures show a dramatic drop in exports, there is a corresponding increase in the figures for South African exports, leading to some suggestion that Zimbabwean production is continuing, but being channeled through South African to enable producers to keep foreign exchange earnings outside the country. This hypothesis is backed up by remarks that production in Zimbabwe is indeed continuing, because it is one of the few products not subject to government export controls.[45]

ZAHVAC currently sells its flake to oleoresin processor Colour X in South Africa at a delivered price for flake of US$ 1.50/kg. However, prices can fluctuate between US$ 1.30 and US$ 1.80.[46] Oleoresin prices have fallen from highs of US$ 40-US$ 50 to around US$ 25/kg as a result of Indian extraction of resin from hot peppers, which is reported to produce a product virtually identical to that from paprika, but at less cost.[47]

## 3.7 Constraints on paprika production

Side-buying is having a more detrimental effect on relationships between competing businesses than is healthy. All efforts so far to curtail the problem have not managed to overcome this destructive behaviour, which could destroy the entire industry overnight.

Credit recovery is an important issue in Zambia, and particularly around Chibombo in Central Province, where knowledgeable operators either do not extend credit[48] or refuse to operate in the area at all.[49] In general, recovery rates are poor and the default cost is invariably passed back to the non-defaulters, raising operating costs and reducing farmer profit and Zambian competitiveness.

Lack of irrigation is seen as a constraint on small-scale production, because it reduces yields to 20 percent of their potential. Because of the large number of small-scale farmers, irrigation offers a way of substantially increasing production.

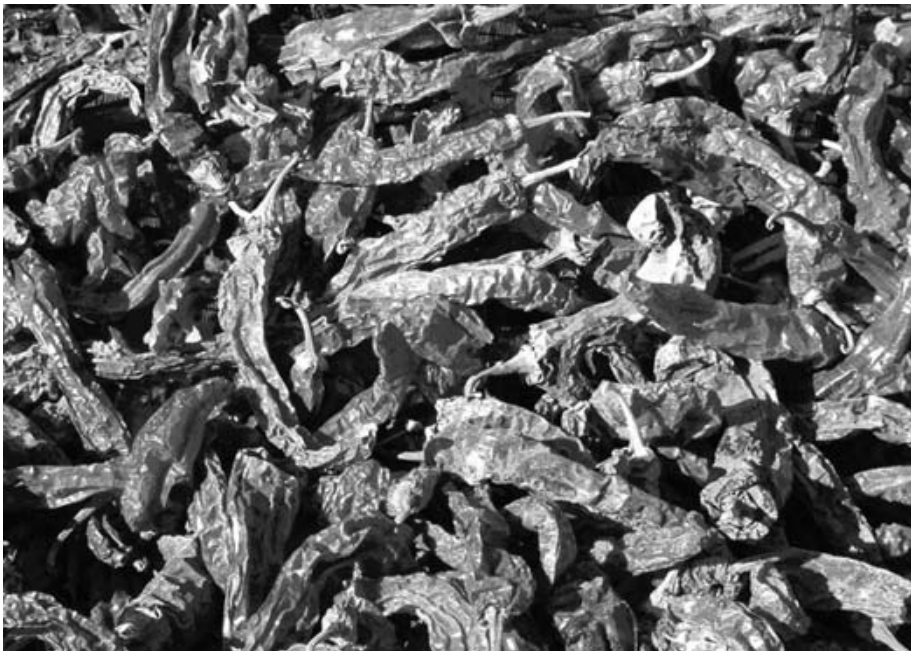
Table 21. CIF Valencia US$/kg cost of shipment from South Africa, Zimbabwe and Zambia. Transport is not considered a constraint on Zambian production, because the commodity is relatively high value and low bulk. Costs of freight to Europe compare well with those from India, with the additional cost of road transport from Zambia representing a small percentage of the overall value of the product. The additional three-to-four-day delivery time is also considered unimportant.

45 Mark Terken, managing director, Cheetah Zambia Ltd.
46 Collins Chitambaka, executive secretary, ZAHVAC.
47 Ibid.
48 Cheetah Zambia Ltd.
49 CLUSA.

## Table 21. CIF Valencia US$/kg cost of shipment from South Africa, Zimbabwe and Zambia

| Origin | CIF Cost (US$/kg) |
|---|---|
| South Africa | 0.12 |
| Zimbabwe | 0.13 |
| Zambia | 0.15 |

# 4. Support facilities, advisory services and information



## 4.1 Supply and distribution of inputs

The supply of inputs – seed, chemicals and fertilizer – on credit is common under agreements in which the farmer agrees to sell his crop to the trader in return for inputs, the costs of which are deducted from the final purchase price, with or without interest. This system has proved precarious, however, because of the prevalence of side-buying and an ingrained culture of debt delinquency by many small-scale farmers; Traders are reporting that they are either reducing the percentage of credit extended, or targeting distribution at selected areas where recovery rates are considered acceptable.

CLUSA encouraged a large number of small-scale farmers to grow paprika by offering high prices and supplying inputs on credit, but the above-market prices were offset by interest rates charged on input credit.

The issue of effective enforcement of credit contracts is a thorny one. The existing judicial system is acknowledged to be inadequate in such matters, with traders virtually never resorting to the courts because of lengthy, expensive procedures and

inadequate remedies, while collateral is often non-existent or insufficient. An agricultural credit bureau recording defaulters and a fast-track agricultural tribunal might go some way to addressing the problem.

Cheetah supplies certified seed, half of which may be supplied on credit for farmers considered sufficiently creditworthy. Training materials are also provided, as are chemicals, if required, either for cash or credit depending on creditworthiness. No fertilizer is supplied because such distribution is considered "politically sensitive". Anecdotal evidence would also suggest that fertilizer may be sold-on or not used on the crop for which it was provided. In virtually all cases, the company attempts to get a down-payment from farmers for inputs, rather than supply full credit. Loan recovery rates are reported at around 80 percent. Seed and chemicals are sold at cost plus a margin for overheads of 10-15 percent and a margin to take account of delinquent loans. Seed costs approximately US$ 8-10/kg, while salvaging seed from a deseeder plant and cleaning it might cost other companies only US$ 0.50/kg.[50] Throughout most of the country, seed is sold to small-scale farmers for a down-payment of ZMK 5 000 (US$ 1.04) for 1 lima,[51] with the balance of ZMK 35 000 to be paid on the contract purchase of the pods. In Chibombo, the terms of sale for seed are ZMK 20 000 (US$ 4.16) down payment, with the balance to be repaid on contract sale. No other inputs are available on credit, but are distributed to farmers on demand for cash payment. The variety is generally CP133, which is sterilized and pretreated with chemicals to prevent disease.

Biopest's recovery rates were considered "poor" at around 58 percent in 2001/02, attributed to drought conditions reducing yields.[52] The company is now considering offering credit on a 'cost-sharing' basis, with credit limited to perhaps 50 percent of the value of inputs. It was recognized that such a strategy needs to be phased in slowly, however, and the company is now sensitizing farmers on the importance of being 'self-sustaining'. The company has five extension officers, each with motorbikes, produces a manual and arranges demonstrations and extension officer training sessions. Loans are received at the beginning of the season from NORAD, through SFAP, to help with the purchase of seed, chemicals and fertilizer, and again for buying the crop. Repayment is then made from the proceeds of sales. NORAD support covers 40 percent of costs and carries interest of around 15 percent under a four-year project that expires after the 2003/04 season. The company is also working on proposals for an irrigation scheme to be funded by SFAP, initially looking at a pilot project with ten farmers with 2 ha each in Kabwe, along a river from which diesel pumps can draw water. The estimated cost of ZMK 31 million[53] per farmer, with repayment over two years, was considered too high and another quote was being sought closer to ZMK 20 million. The irrigated plots are expected to yield 2.5 tonnes/ha, which at last year's price of ZMK 2 800/kg

50 Estimate from Mark Terken, managing director, Cheetah Zambia Ltd.
51 One lima is a quarter of a hectare.
52 Criven Chimoga, project coordinator, Biopest Company Ltd.
53 Quoted to Biopest by Amiran Ltd.

would have grossed each farmer ZMK 14 million. While proceeds would thus fall short of loan repayments, farmers would also be encouraged to intercrop their paprika with tomatoes or other vegetables to boost returns.

ZAHVAC members Agribim, Enviro Oils and BioPest provide free seed for 1 lima in return for a ZMK 30 000 (US$ 6.25) membership fee, and Biopest and other ZAHVAC members supply Paprika King seed in 1-kg packs, enough for 1 ha. Other ZAHVAC members offer similar arrangements for the supply of inputs.

## 4.2 Advisory and information services

Given the management skills required to grow paprika, strong advisory and information services are important. Most farmers rely on information, support and training from key buyers. In the past ZAHVAC has arranged combined training sessions for extension officers from all its member companies, but more recently members are finding it more convenient to tailor training to their specific needs. The association continues support for member training manuals and works to ensure responsible use of chemicals by encouraging the use of pyrethroids in preference to agrochlorines, which produce residual effects and are being regulated by the European Union and the Zambian Government.

Cheetah has ten extension officers, who have one field assistant each. They are responsible for: provision of direct extension services to their clients, the paprika farmers; training MACO camp staff; and teaching students at Chibempi Farm College as part of the syllabus. They provide a production manual, newsletters, extension services, including visits and field days, and quality control and ASTA analyses through Cheetah's own laboratory facilities. In the past the company conducted variety trials, but has since stopped because of cost.

Biopest is seeking to raise funds to establish an ASTA-testing laboratory. Each of its contract farmers would have access and thus the choice to be paid on ASTA value rather than grade. The laboratory is estimated to cost around US$ 150 000.

MACO has a series of publications on agricultural production that are used by the Extension Department – Economic Expansion in Outlying Areas (EEOA) – and is preparing a publication on paprika for this series.

CLUSA provides training and information to paprika growers through farmer group leaders on behalf of SHEMP.

## 4.3 Capacity support for paprika

Lack of funding is a significant constraint on the industry, according to buyers, along with availability of fertilizer. Biopest, for example, says it has distributed enough seed for 435 ha, but chemicals for only 150 ha, and no fertilizer at all for the 2002/03

season. ZAHVAC is one of the most significant players in the market from the point of view of marketing. It has five paprika-growing members: Agribim, Biopest, Mipachima, Steadfast and White Rose. Cheetah was also a member in the past, but no longer. Those companies buy paprika under contract from small-scale farmers and ZAVHAC processes and markets the crop on their behalf. It also acts as a conduit through which funding is raised to support members' activities. The association was started in 1997 with support from the European Union's Export Development Programme (EDP), which expired in 1998. The association is now confident of continued support under the EDP II programme, due to commence in 2003, through which it hopes to gain access to technical assistance in the form of technical consultants.

ZAHVAC also acts as a central point for funding from SFAP that assists members in farmer mobilization, facilitating extension services. In 2002 the government earmarked ZMK 10 billion for agriculture development, of which ZAHVAC, through SFAP, has received some ZMK 2.5 billion.[54] Table 22. Number of farmers and hectarage of paprika contracted by ZAHVAC members for 2003. There are 4 700 farmers farming 2 320 ha.

**Table 22. Number of farmers and hectarage of paprika contracted by ZAHVAC members for 2003**

| Member | Farmers | Hectarage |
|---|---|---|
| Biopest | 800 | 260 |
| Agribim | 2 500 | 1 500 |
| Mipachima | 800 | 260 |
| Steadfast | 400-600 | 200 |
| White Rose | 200 | 100 |
| Total | 4 700 | 2 320 |

ZAHVAC takes delivery of raw paprika from its five members, regrades it, then deseeds and bales it. Its machine is capable of producing paprika powder, but in practice only flake is produced, which offers a higher market price and has a more transparent market. It is also responsible for marketing paprika on behalf of its members. To date all of its production has been sold to a single buyer in South Africa, Colour X, which on-processes the paprika into oleoresin. Cheetah also sells to the same company. It is expected that ZAHVAC member production will be fed through Enviro Oil's oleoresin plant in Lusaka, once it has been rehabilitated this year. The association is also promoting a scheme for small-scale paprika farmers, with the

54 Collins Chitambaka, executive secretary, ZAHVAC.

ultimate aim of having 1 000 ha under irrigation. It has been working with the Rural Investment Fund (RIF) as a potential source of funding, and the African Development Bank (ADB) has been approached for support to bring the irrigated hectarage up to 2 000-3 000 ha. Perhaps half of that production would then be processed through Enviro Oil's plant.

The Agribusiness Forum (ABF) is a registered society with corporate members from the private sector that are interested in buying produce from small-scale farmers and outgrowers under contract. Its members include Dunavant Cotton, Clarke Cotton, Agribim, Cheetah and CLUSA. There is a database available to members that enables them to identify sources of finance for activities involving investments in small-scale farmers and outgrowers.

SHEMP finances a five-year project, begun in 2003 and implemented through CLUSA, that is focusing on developing associations and cooperatives based on the Dunavant Cotton extension model.

The objectives of the Zambia Agricultural Technical Assistance Centre focus on increasing demand for small-scale-farmer agricultural production and goods and services of rural non-farm enterprises, as well as the number of agribusinesses that buy output and sell inputs to farmers. These objectives are met through the provision of market and demand analysis, market development and expansion, skills development and information dissemination, and linkages to finance and policy advocacy. The centre is presently working with Cheetah.

The paprika industry in Zambia has received a significant amount of support from donor agencies and other funders. Both Cheetah and ZAHVAC members receive funding support from SFAP towards the cost of extension.

# 5. Policy support

## 5.1 Government support for paprika

The Government earmarked ZMK 10 billion (US$ 2.1 million) for agricultural development and allocated ZMK 2.5 billion (US$ 520 800) to ZAHVAC through SFAP.[55] It influences the provision of grants, training and technical assistance from donors to ZAHVAC.

Biopest believes it is beginning to see some government support, with agriculture in general being seen as a central plank in the new Mwanawasa Government's economic policies. Zambia is not considered competitive by world standards, and is still in need of strong support from donors and the Government.[56]

MACO extension staff offer some advice on paprika growing, and there is some overlap and/or liaison with commercial extension staff. However, there is no officer within the ministry specifically designated to oversee paprika production.

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55 SFAP is a joint initiative of ZNFU and ABF, funded by MACO and NORAD.
56 Criven Chimoga, project coordinator, Biopest Company Ltd.

Crop diversification in general is recognized by politicians as important, as evidenced by an opposition motion in Parliament urging formation of a formal government policy on crop diversification in order to tackle food shortages.[57] The Government said it recognized the need for diversification. Arguably, lack of government intervention has stimulated growth in the paprika industry, allowing commercial traders to conduct business under fairly free market conditions, although financial support has had a more controversial effect. Increased government attention has proved detrimental to agricultural production, as demonstrated by distortions in the maize market.

## 5.2 Review of agricultural policies

A licence is required to trade in paprika. It is issued by the Ministry of Commerce, with reference to MACO. Licences are also required to distribute chemicals and seed and to export agricultural produce. These are standard business practices in Zambia. Licence applications are not difficult and are welcomed by the main industry players as a way of regulating unscrupulous 'fly-by-night' traders, who have reportedly come from South Africa and disappeared without paying farmers for their crop. Agricultural produce levies are due itinerantly at district boundary checkpoints.

Enviro Oils requires a manufacturing licence costing ZMK 295 000 per year for its oleoresin plant, and pods and spices need a phytosanitary certificate for export, at ZMK 40 000 per year. The Seed Control and Certification Institute (SCCI), which is part of MACO's Mount Mukulu Research Station, certifies paprika seed. Export permits are required for export from Zambia, renewable every quarter at ZMK 300 000. Customs clearance usually takes 24 hours.

The provision of credit in the agricultural sector does not come under the rigours of the Finance Ministry. No licence is required to issue debt to farmers, although such debt is subject to the Agricultural Credit Act 1995, which provides for the registration of charges and sets out contract requirements to ensure validity and enforceability.

## 5.3 Review of international and regional trade policy

### 5.3.1 Codes

Three customs codes are applicable under the European Union's Harmonized Commodity Description and Coding System (HS): 3203.00 (colouring matter of vegetable or animal origin), 3301.90.39 (other extracted oleoresins) and 0904.20

57 "MPs call for crop diversification", *Times of Zambia*, 28 November 2002.

(*Capsicum,* spices and herbs). Table 23. Detailed European Union customs codes applicable to paprika spices and herbs. Because the volume levels are low for oleoresins and food colourings, there are no further codes more appropriate for paprika products. The United States customs code for paprika is 0904.20.20.00 and for other capsicum peppers, ground, 0904.20.76.00.

**Table 23. Detailed European Union customs codes applicable to paprika spices and herbs**

| HS code | Product description |
|---|---|
| 0904 20 10 | Paprika excluding crushed or ground |
| 0904 20 31 | Dried fruit of Capsicum for manufacture of capsicin or capsicum oleoresin dyes, excluding crushed or ground |
| 0904 20 35 | Dried fruit of Capsicum for industrial manufacture of essential oils of resinoids |
| 0904 20 39 | Dried fruit of Capsicum excluding 0904 20 35 |
| 0904 20 90 | Crushed or ground fruit of Capsicum |

Paprika extracts (Capsanthine and Capsorubin) are designated Code E160(c) under European Union regulations. An extract with an E number is recognized as safe by the European Union's Scientific Committee on Food.

### 5.3.2 Tariffs and quotas

Under the Lomé Convention between the European Union and African, Caribbean and Pacific countries, most goods originated from those developing areas can be imported into the European Union duty free. There are no quotas for paprika, and tariffs are not an issue in exportation to South Africa. Neither have problems been reported in exporting to Europe.

## 5.4 Risks

Climatic conditions, particularly in Southern Province, which is arguably the province most suited to paprika production, have been variable and unreliable.

Transport costs have an impact on the transport of cotton and tobacco so fuel prices and market prices of cotton and tobacco will increasingly have a bearing on cash crops grown by smallholders as they become more sophisticated.

Reports of deteriorating seed quality and a declining reputation for quality in the world market need serious attention by buyers.

Side-buying and increasing debt delinquency by farmers can only increase operating costs, which reduces profits for the buyers, eventually driving them from the market. These risks also diminish financial strength and market stability.

## 5.5 Political goodwill

The proprietors of ZAHVAC member companies are all influential businesswomen with strong political connections, and the recent allocation of ZMK 2.5 billion to ZAHVAC demonstrates a commitment to the development of the paprika industry in Zambia.

# 6. Conclusions

Most small-scale farmers work about 2 limas (0.5 ha), get yields of around 800 kg/ha and 360 kg per farm, and use few or no inputs. The average farm-gate price range in 2002 for the average farm product was ZMK 2 622 (US$ 0.546)/kg and the range was from ZMK 2 955 (US$ 0.62) to ZMK 2 263 (US$ 0.47)/kg. Although the area under maize declined and person-days increased significantly when farmers moved into paprika, it cannot be concluded that this is causal without more in-depth study. Transplanting and destalking/deseeding are activities mainly undertaken by women; men mainly undertake cultivation and reaping; baling is exclusively undertaken by men; and both men and women do the land preparation and drying/grading. On average, men and women are equally involved in paprika production. Men prefer to spend their increased wealth on farm inplements, inputs and school costs, while women prefer to spend their money on clothes, kitchen utensils and inputs. Jointly, the family would buy inputs. Men and women reported that their incomes rose significantly after including paprika in their cropping systems – by ZMK 450 000 (US$ 94) and ZMK 200 000 (US$ 42) respectively.

Quality is measured in ASTA levels, which are affected by seed quality, poor management, climate, excessive storage, poor drying, pests and disease. Pungency and aflatoxin levels are also quality issues. The main annual crops competing with paprika are cotton and tobacco. Cotton has higher input expenses but lower return; tobacco has higher input expenses and higher return; and paprika has the highest return for the lowest input expenses. In comparison with other competing annual crops, revenue from paprika is higher than cotton, while the direct costs and labour needs are lower than both cotton and tobacco. However, it remains less profitable than tobacco. Paprika is therefore a competitive crop, but like any new crop there is inertia slowing adoption.

There are facilities in Zambia for spice production, and oleoresin production was to start in 2003. Presently, graded pod is sold to South Africa, Europe and the United States, and spice is sold to Europe. Most of the pod to South Africa is used to produce oleoresin. There are seven buyers of paprika pods from small-scale farmers in Zambia; Cheetah and Agribim are the largest. Five are members of ZAHVAC. Buyers generally contract either with individual farmers (Cheetah) or groups of farmers (ZAHVAC members).

The contract is associated with limited credit for inputs, particularly seed and chemical, and sometimes fertilizer. Prices are not fixed at the beginning of the season, and are adjusted following analysis of ASTA levels. The data reported for paprika imports in both the United States and the European Union are not reliable, because paprika is aggregated with capsicum peppers. The export data are not reliable in

Zambia because of reliance on non-public, competitor information. Nevertheless, it appears that South Africa and the European Union import 50 percent each of the Zambian product. The United States occasionally imports whole pods. The most important constraints on paprika production are side-buying and credit recovery. Both of these have the potential to destroy the industry. From the buyers' and small-scale farmers' perspectives, irrigation would substantially increase production.

Buyers provide limited inputs, seed and chemicals, and credit facilities. In general, a small-scale farmer can receive inputs on credit and have a guaranteed buyer. Advice and information on growing paprika comes almost exclusively from the buyers' own extension services. The know-how for growing paprika is not general knowledge and fellow farmers are not a safe source of information, but the radio could be used to promote paprika more generically. There are at least six funding and associated agencies presently involved with the paprika industry that substantially support extension services, outgrower development and infrastructure development.

More recently there has been financial support to the paprika industry from the Government, via SFAP and ZAHVAC, but there is only tacit support from MACO. Separate licences are required to trade in, process and export paprika. Seed is certified, and both pod and spice need phytosanitary certificates before export. There are presently no official barriers for Zambia producers to exporting paprika products to Southern Africa, the European Union or the United States.

# 7. Recommendations

## 7.1 Summary of diversification features

- Appropriate climatic conditions
- Promotion by buyers
- Availability of market
- Perceived credibility of buyers
- Profitability
- Availability of inputs
- Availability of input credit
- Perceived comparative advantages over cotton and tobacco
- Availability of focused extension advice and information from buyers.

## 7.2 Recommendations for encouraging diversification into paprika

- Targeting of areas where conditions are appropriate
- Encouragement of commercial buyers
- Facilitation of market
- Improvement and/or maintenance of profitability by:
  - Increasing revenue:
    - Increasing yield
    - Improving quality
    - Adding value
    - Transparency in grading process
    - Provision of extension advice
    - Provision of price information
  - Reducing costs:
    - Provision of inputs
    - Provision of credit
    - Reducing uncertainty